

USDN Equity in Energy Transformation and Innovation:

HeatSmart/CoolSmart Somerville Program

Snapshot

From August 2017 to February 2018, the City of Somerville, Massachusetts, ran a community group purchasing and outreach program for air source heat pumps (ASHPs) called HeatSmart/CoolSmart (HSCS) Somerville. The city-led program emphasized community collaboration and allowed all residents to leverage reduced pricing for ASHP installations. HSCS Somerville offered an affordable pathway for income-eligible homeowners to receive zero-interest, deferred-payment loans for renewable heating and cooling installations.

Key Information:

- **Technology:** ASHPs
- **Financing:** Deferred-payment loans and rebates
- **Funding Source:** HUD Community Development Block Grant, Carbon Neutral Cities Alliance grant, utility energy efficiency grants, and installer reduced pricing
- **Ownership:** Households
- **Location:** Somerville, Massachusetts

STAGE 1—PROGRAM DESIGN PROCESS

Program Genesis

HSCS Somerville built on the City of Somerville's prior success with a community group purchasing program (Solarize Somerville, conducted in 2016). To meet its goal of becoming a net zero city by 2050,¹ Somerville recognized the need to help bring more renewable heating and cooling (RH&C) technologies to its residents. **In Somerville, approximately 23 percent of community greenhouse gas emissions come from thermal energy usage in homes.**² The City also looks for opportunities to **design programs that deliver economic and sustainability benefits to low- and moderate-income (LMI) residents.**³

In 2016, an opportunity to develop the HSCS program arose when Somerville applied for Carbon Neutral Cities Alliance (CNCA) funding jointly with four other cities (Boston, MA; Northampton, MA; Portland, ME; and Providence, RI). The cities were collectively awarded the \$125,000 grant from CNCA’s Innovation Fund, which was used to fund campaign technical assistance and market analysis services.⁴ **HSCS Somerville launched in August 2017 and ran until mid-February 2018.**

To best utilize the CNCA opportunity and available resources, Somerville **drew on successful approaches from prior initiatives within their community context, using its recently completed Solarize campaign** as an example. In Solarize campaigns, **community groups or local governments use discounted bulk purchasing to help homeowners purchase rooftop solar systems.**^a The recent Solarize program had primarily reached middle- and upper-income residents, and it was expected that more affluent residents would be most able to take advantage of the HSCS opportunity, despite larger state incentives available for LMI households. As a result, the City aimed to **create a pathway within HSCS that was inclusive of more LMI households.**

Somerville narrowed the focus of its program to a specific RH&C technology—ASHPs—based on three factors: **(1) likelihood of household adoption, (2) ability to utilize existing financing incentives and programs, and (3) maximizing impact for participants.**⁵ To determine these factors, the City used maps identifying geographic locations of the most likely adopters of each technology and examined which technology would minimize up-front costs and maximize savings.

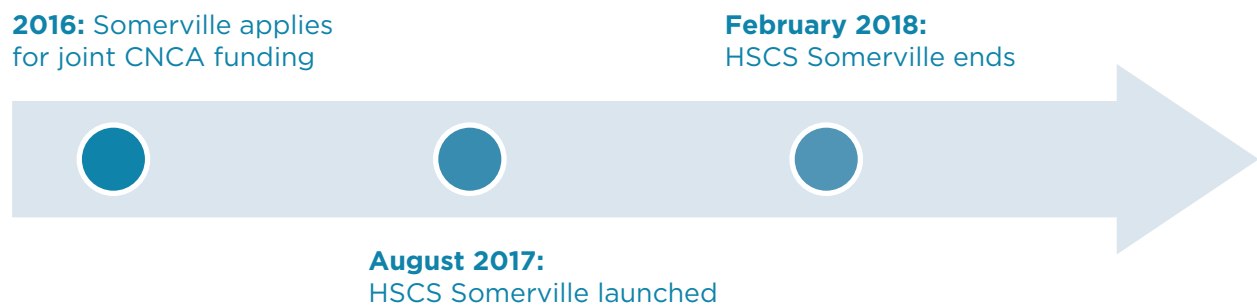


Figure 1: Program Development Timeline

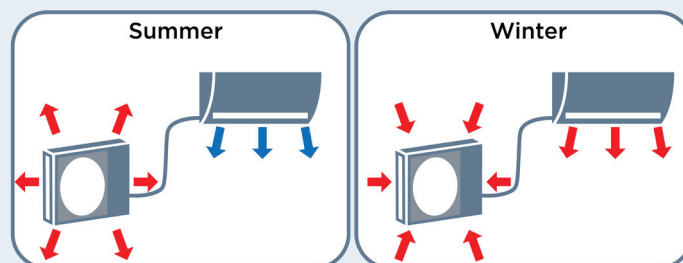
^a For more information, visit <http://www.masscec.com/solarize-mass>.

Key Actors and Partnerships

- **The City’s Office of Strategic Planning and Community Development, Housing Division, and the Department of Sustainability and Environment** worked together to administer the HSCS Somerville program. The Housing Division had previous experience working with **U.S. Department of Housing and Urban Development (HUD)** grants for the City’s affordable housing programs. This experience allowed the housing division to provide insight into how HSCS could connect with available HUD funding.⁶
- The Housing Division launched a request for qualifications to select program installers and organized an **Installer Selection Committee** to review bids received. City staff led the committee, with consulting team support and representatives from other city and state organizations observing. Through this competitive procurement process, **two installers were chosen, New England Ductless and N.E.T.R. Inc.**
- In terms of financing and incentives, the City connected participants to existing state programs, including **Mass Save’s HEAT Loan, residential incentive programs, and Massachusetts Clean Energy Center’s (MassCEC) Clean Heating and Cooling program.**^b To improve the effectiveness of their outreach efforts, the City also partnered with community groups including the **Seniors Housing Task Force**, through a community member outreach volunteer.⁷

What Are Heat Pumps?

ASHPs are highly efficient appliances for home heating. This is because they do not release heat (e.g., through combustion or resistance). Instead, ASHPs can move heat in or out of a building, which enables them to provide both heating and cooling. Heat pumps provide heating by using a refrigerant to absorb heat from the outdoor air and transfer it indoors, and can provide cooling **like a conventional air conditioner** by reversing the process. Conventional ASHPs used throughout the South and Mid-Atlantic states are centrally ducted and are not well-suited for colder climates. Therefore, HSCS Somerville focused on newer cold-climate ductless heat pumps (also known as “mini-splits”) that can extract heat from the air at -13°F and must be able to meet rated capacity at 5°F .



^b For more information on available incentive programs, visit <http://www.masscec.com/learn-about-air-source-heat-pumps>.

STAGE 2—PROGRAM STRUCTURE

User’s Perspective: The HSCS Somerville program was a fixed, short-term campaign that included a variety of outreach events and marketing to educate customers and connect residents to the selected installers. The base price to install an ASHP is **highly dependent on the specifics of a home:** a single-head (or single-zone) ductless heat pump system costs between **\$3,500 and \$5,500 before rebates (most common)**, with the price increasing for multi-zone and centrally ducted systems from **\$8,000 to \$19,000 or more.**⁸ **The average system installed through HSCS Somerville cost approximately \$13,800**, providing roughly 2.8 tons of heating capacity at 5°F (providing homes with a majority of year-round heating and/or cooling needs). Two pathways existed for residents to participate in the program:

- **Non-LMI residents** interested in the program could sign up on the HSCS website, indicating which installer(s) they were interested in working with. The **installer(s) selected would reach out to the resident, conduct a no-cost home site visit, and provide a quote.** Residents interested in moving forward with an installation had their systems installed (usually completed in a few days) and received support from the installers to fill out rebate and loan applications.
- **LMI residents** interested in participating in the program were directed to the income-based program pathway by Housing Division staff. This required **an application and income-verification documentation to the City to ensure eligibility for the City’s Housing Rehabilitation Program** (further described in the Funding and Financing section below). After the resident’s application was approved, the City’s program manager would send a confirmation letter to the resident. The program’s HUD funding required that the **City conduct a site visit and specify the scope of work to be completed.** After the City provided a scope of work, per HUD funding requirements, all eligible installers (including the two installers selected for the City’s non-income-eligible program) could respond with quotes. The lowest bid was then selected.⁹

Administrator’s Perspective: As the City of Somerville’s Director of Sustainability Oliver Sellers-Garcia explained, the City’s role was largely “to help residents navigate a complicated renewable energy installation project.”¹⁰ The City’s role as program administrator included the following:

- Based on their Solarize model, the City **selected the participating installers to bring lower installation rates and equipment costs** to the residents through negotiated discounts.
- Throughout the program, Somerville was responsible for coordinating interested community members and **connecting them to the appropriate funding sources and other incentives.**



HSCS tabling at a community event
(Photo Credit: Jeremy Koo, The Cadmus Group)

- **The City conducted outreach to attract participants** and held “Meet the Installer” events to increase community awareness of the various funding options for installing ASHPs
- The City also connected with community members by creating a **Volunteer Coach position**. This Volunteer Coach led the outreach and tabling events, and, as a member of the community, could speak to residents with personal understanding of the unique community context. The Volunteer Coach also received training on community-based social marketing before starting in the role, which helped make outreach successful. The Volunteer Coach served to lead broader program outreach and did not focus on recruitment for the program’s the LMI pathway.
- **Educating residents through outreach** was an important role for the City. Unlike the solar photovoltaic systems installed through the Solarize campaign, ASHPs are a less understood technology, and **residents are less aware** of the technology. Moreover, the variety of equipment, multiple application pathways, and building-by-building customization needed for successful ASHP programs makes educating customers more challenging. This challenge is especially acute regarding transparently communicating costs and potential energy savings.

Funding and Financing

Funding Sources and Structure: The City spent \$15,000 on marketing activities and additional incentives (e.g., Visa gift cards) using funding from utility energy efficiency program grants, and consulting services for technical assistance were funded through the CNCA grant. Additionally, the City was able to leverage private funding to support campaign outreach: the two participating installers funded an additional \$10,500 in marketing activities (41 percent of total marketing costs for the program).^c

Financing and Incentive Options for Participants: The program’s partnership with the selected installers led to a discount for participating residents of up to 15 percent of the cost of installation.¹¹ The program also leveraged multiple financing mechanisms for residents using existing State, utility, and City programs.

Incentives: Somerville residents could access multiple incentive programs:

- [Mass Save](#), the State’s ratepayer-supported energy efficiency program, offers incentives for mini-split heat pumps. During the program, Mass Save offered a rebate of up to \$300 per unit.¹²
- [MassCEC](#), a quasi-public, ratepayer-funded State economic development agency offers rebates for ASHPs through the Clean Heating and Cooling Program. These rebates start at \$625 per indoor unit or ton of heating capacity (up to \$2,500), with income-based rebate adders offering 28-percent and 60-percent larger rebates for households below 120 percent and 80 percent of the state median income, respectively.¹³

^c As installers in good standing with their preferred manufacturer (Mitsubishi Elite Diamond Contractors), the two installers had access to cooperative marketing funding in which funding for approved marketing campaigns provided by the contractor would be matched by their distributor and the manufacturer.

- [The City of Somerville](#) also offered an additional \$100 Visa gift card incentive to the first 50 program participants, funded by utility energy efficiency grants. To be eligible for this incentive, residents were required to have completed their installation, have applied for MassCEC rebates, and help promote the program (e.g., post about the program on social media or create slides on their installations to share at community events).

Loans: Somerville residents could also access multiple financing pathways:

- [The Mass Save HEAT Loan](#) can be accessed to finance the installation of eligible ASHP systems (in conjunction with other eligible energy efficiency measures, if necessary). Participating lenders offer loans of up to \$25,000 at 0-percent interest for terms of up to 7 years. A prerequisite for receiving the loan is completing a Mass Save Home Energy Assessment, a no-cost home energy audit that is also required for the MassCEC rebate and other Mass Save incentives. The HEAT Loan’s interest rate buydown is funded through Mass Save’s ratepayer-funded residential efficiency programs.¹⁴
- **Installer financing** was made available to homeowners. The two installers offered a variety of financing options (e.g., “same as cash” and other multiyear loans) through Synchrony Bank, which partners with Mitsubishi Electric, the ASHP manufacturer used by the two selected installers.
- [The City of Somerville’s Housing Rehabilitation Program](#) is funded through HUD’s Community Development Block Grant (CDBG) program.^{15,d} The City of Somerville used the rehabilitation loans as a **financing pathway only available to residents who are at or below 80 percent of the area median income** (\$62,550 for a two-person household in Somerville).¹⁶ Income-eligible HSCS participants were able to access the Housing Rehabilitation Program, which offers a **deferred-payment 0-percent interest loan** that covers up to \$25,000 per unit for a range of renovations, including energy efficiency and renewable energy renovations, such as ASHPs.
- Payment on this loan is deferred until the homeowner decides to sell the home or transfer the deed and it **can be used to finance for a supplementary heating system**, which is common for many ASHP installations in Massachusetts.
- The housing rehabilitation loan also allows income-eligible renters to apply through their landlords, even if the landlord themselves do not fall under the required income eligibility. Through the housing loan, **the rent cannot be raised for the duration of the loan**, keeping the housing affordable even with the renewable energy innovations.¹⁷

d For more resources on the state CDBG guidelines, tools, and webinars, visit <https://www.hudexchange.info/programs/cdbg-state/guides/#resources>.

Stage 2: Core Equity Components

Reduce Financial Burdens: RH&C technologies, like other renewable energy technologies, can be challenging for LMI residents to afford. Where financing mechanisms (e.g., loans, third-party ownership models) are available, LMI residents often lack credit scores for loan approval via more traditional financing pathways. HSCS Somerville was able to **offer a lower-risk financing option** designed for LMI residents through its Housing Rehabilitation Program, which, in conjunction with installer discounts and Mass Save/MassCEC rebates (and income-eligible adders), provided a viable, equitable financing option for LMI households.

STAGE 3—IMPLEMENTATION AND EVALUATION

Impact

- Between August 2017 and February 2018, the HSCS program **conducted 246 site visits for households interested in participating and completed 59 installations.**¹⁸ The City of Somerville found that the largest impact this program had was **increasing awareness, knowledge, and recognition of the RH&C technologies.** Two of the contracts signed through the program utilized the rehabilitation program pathway to date, and three more households expressed interest, but did not follow through with installations.¹⁹
- However, since the program ended, more income-qualified residents have continued calling to inquire about the Housing Rehabilitation Program for ASHPs, which **demonstrates success in outreach and education** to build sustained interest in and knowledge of the technology. Somerville has since been directing these residents to MassCEC and the Housing Rehabilitation Program (although HSCS has ended, the Housing Rehabilitation Program still exists).
- In terms of broader educational impact, through its marketing and social media outreach, the City's HSCS website had more than 3,000 unique page views during the campaign. As Christine Andrews, the Environmental Housing Programs Coordinator for Somerville and City Lead Coordinator for HSCS, explains, the rehabilitation program made homes both safer and more energy efficient.²⁰



Residents attending one of three heat pumps 101 workshops. (Photo Credit: Jeremy Koo, The Cadmus Group)

Stage 3: Core Equity Components

Make it easy: HSCS Somerville staff intentionally held events and workshops located in areas of the city that would be most likely to make use of the Housing Rehabilitation Program (i.e., had higher shares of LMI residents). These outreach opportunities included both standalone community events and **tabling at existing community events**, which allowed residents to connect with installers to learn about heat pump technology and the HSCS program. The City also promoted the program through numerous TV interviews, phone banking, listservs, social media posts, newsletters, and flyers. One approach that Somerville took to more directly target LMI residents was to **include inserts about the program in city water bills**. The City also reached out to various **community groups that work with LMI residents**, such as the Senior Housing Task Force. Additionally, the Council on Aging, which provides elder services for Somerville, included HSCS program information in their newsletter.

Community Context

Like many cities in the rapidly growing Greater Boston region, the City of Somerville faces a growing challenge to keep housing affordable in its city. Somerville's housing stock is aging, and most homes in Somerville are heated with natural gas, which makes it challenging to realize financial savings from ASHPs, given Massachusetts's relatively low natural gas costs and high electricity costs. The City also has an elevated percentage of renters in its population.

- Located in the Boston metro area
- 81,300 residents
- 60 percent renters
- 75 percent reside in 2- to 4-unit multifamily buildings
- 90 percent of housing stock was built before 1978
- 14 percent poverty rate

Challenges

1. **Staff labor requirements were significant** given the greater day-to-day role the City played in administration: Somerville estimated that approximately 1,000-person hours were needed to design and implement HSCS. Municipalities with more limited staff capacity may **consider alternative models** (e.g., not directly administer the program) that strategically reduce City engagement and/or **leverage greater support from community volunteers or networks**.

2. While the Housing Rehabilitation Program technically allowed renters to participate in the program through their landlords, the program saw very **limited renter interest**. This is likely because of requiring landlord buy-in for the upgrades, and the split-incentive challenge wherein landlords are responsible for upgrade costs while tenants receive the benefits of reduced energy bills.

3. Somerville's **housing stock** and residential heating fuel mix pose significant challenges to ASHP adoption. With an elevated percentage of old, small multifamily buildings in densely populated neighborhoods occupied by a majority-renter population, **ASHPs can be challenging to install** (e.g., because of added costs for extensive customization, upgrading electrical service, lack of space for outdoor units, need to secure condo board approval, etc.). In Somerville, ASHPs generally **do not provide bill savings compared with natural gas** because of the area's high electricity and low gas prices (though they generally do when replacing electric resistance heating and oil heat).
4. Consequently, the City needed to design and implement **nuanced marketing and education approaches** depending on the targeted population. Municipal officials interested in implementing similar programs should **assess the state of the housing stock and heating fuel mix** in the context of determining ease and likelihood of ASHP adoption.
5. The high up-front cost of ASHPs inherently presents challenges to LMI participation. Although Somerville aimed to address this challenge through promoting access to incentives and offering the Housing Rehabilitation Program, ASHP systems may remain unaffordable to many residents. Municipal leaders interested in launching similar programs should **consider the availability of incentive and financing programs**—especially to further encourage LMI participation—to determine whether ASHP systems can become sufficiently affordable.

TOOLS FOR CITIES AND PARTNERS:

1. HSCS developed a [Heat Pump Rebates Guide](#), which is an easy-to-read explanation of financing and incentive options in Massachusetts.
2. Somerville also contributed to a [Community-Based Social Marketing Toolkit](#) developed by the U.S. Department of Energy.
3. The U.S. Department of Energy offers a [larger set of marketing resources for residential buildings](#).

Lessons Learned

HSCS Somerville was a successful pilot program for accelerating awareness and adoption of ASHPs that also established a viable participation pathway for some LMI residents. Lessons learned include:

- **Staff capacity and organizational structure:** Participating installers appreciated having a City staff member with access to other City resources and connections serving as their dedicated point of contact. In terms of the income-qualified pathway, the City's ability to route interested residents through the Housing Rehabilitation Program pathway was particularly important.
- **Lesser-known technology:** Resident and City staff awareness of heat pump technology was limited at the start of the program, curtailing initial interest and potentially making customer lead conversion rates lower than if residents had held deeper understanding of the technology before reaching out to an installer organically.²¹ Municipalities considering having staff participate in technical aspects of the program (e.g., sizing and specifying equipment for systems) should consider holding trainings for staff led by manufacturers or third parties prior to the program launch.
- **Strength of local supply chain:** Both installers and City staff highlighted the strong relationship between the City and installation partners as an important aspect of the success of HSCS Somerville.²²

HSCS demonstrated effective use of funding and financing sources, and outreach initiatives. By utilizing non-Federal grants, leveraging existing Federal level funding sources, and drawing on installer contributions, the program could provide a program that reached and was accessible to a wide audience. The program had a clear structure and communication between partners and community members, while also involving the community. The program's strategies have enabled HSCS Somerville to provide a pathway for LMI residents to participate in ASHP installations.

Replicable Elements

Stage 1: Gather baseline data and assemble the city team

- Complete an assessment of the local housing stock, ASHP supply chain, and existing municipal programs.
- Determine staff capacity to support program.

Stage 1: Partner with experienced and trusted community organizations

- Identify gaps related to municipal engagement with target communities, as well as key stakeholders and community networks.
- Recruit partners with a trusted presence in the community to drive outreach.
- Partner with installers willing to engage with the community on technology education.

Stage 1: Select and deploy appropriate modes of engagement

- Recruit program ambassadors.
- Develop tailored marketing materials to targeted populations.

Stage 2: Choose an appropriate financing mechanism

- Explore the availability of financing and incentives offered by State, utility, Federal, and other actors that can encourage LMI adoption. One option includes HUD funding.

Stage 3: Recruit program participants and administer the program

- Offer pathways for participation that are tailored to the needs and context of LMI residents.

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Photo Credits:

- Jeremy Koo, The Cadmus Group. *HSCS tabling at a community event.*
- Jeremy Koo, The Cadmus Group. *Residents attending one of three heat pumps 101 workshops.*

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- ¹ City of Somerville. "SustainaVille." 2018. <https://www.somervillema.gov/sustainaville/carbon-neutral-goal>.
- ² City of Somerville. Greenhouse Gas Inventory Report. 2017. <https://www.somervillema.gov/sites/default/files/somerville-greenhouse-gas-inventory-report.pdf>.
- ³ Sellers-Garcia, Oliver. Interview by Laura Simmons-Stern and Julie Curti. Personal Interview. May 10, 2018.
- ⁴ Koo, Jeremy. Bringing Renewable Thermal Solutions to New England Cities: Key Findings from Pilot Renewable Heating and Cooling Campaigns. Carbon Neutral Cities Alliance. March 30, 2018. <http://carbonneutralcities.org/wp-content/uploads/2018/05/2.Campaign-Key-Findings-Report-1.pdf>.
- ⁵ Andrews, Christine. Interview by Laura Simmons-Stern and Farrah Andersen. Personal Interview. April 30, 2018.
- ⁶ Sellers-Garcia, Oliver. Interview by Laura Simmons-Stern and Julie Curti. Personal Interview. May 10, 2018.
- ⁷ Koo, Jeremy. Interview by Laura Simmons-Stern and Farrah Andersen. Personal Interview. April 16, 2018.
- ⁸ City of Somerville. "About HeatSmart/CoolSmart Somerville." 2018. <https://www.somervillema.gov/departments/programs/heatSMARTcoolSMART-somerville>.
- ⁹ Andrews, Christine. Interview by Laura Simmons-Stern and Farrah Andersen. Personal Interview. April 30, 2018.
- ¹⁰ Sellers-Garcia, Oliver. Interview by Julie Curti. Personal Interview. May 10, 2018.
- ¹¹ "New Somerville Program to Offer Heating, Cooling Alternative." Wicked Local. August 15, 2017. <http://somerville.wickedlocal.com/news/20170815/new-somerville-program-to-offer-heating-cooling-alternative>.
- ¹² Mass Save. "Electric Heating and Cooling Equipment." 2017. <https://www.masssave.com/en/saving/residential-rebates/electric-heating-and-cooling/#title4>.
- ¹³ MassCEC. "Income-Based Rebate Adders." 2017. <http://www.masscec.com/income-based-rebate-adders>.
- ¹⁴ City of Somerville. "About HeatSmart/CoolSmart Somerville." 2018. <https://www.somervillema.gov/departments/programs/heatSMARTcoolSMART-somerville>.
- ¹⁵ Andrews, Christine. Interview by Farrah Andersen. Personal Interview. April 30, 2018.
- ¹⁶ City of Somerville. "Maximum Income Limits for Housing Programs." 2018. <https://www.somervillema.gov/maximum-income-limits>.
- ¹⁷ Andrews, Christine. Interview by Laura Simmons-Stern and Farrah Andersen. Personal Interview. April 30, 2018.
- ¹⁸ Koo, Jeremy. Bringing Renewable Thermal Solutions to New England Cities: Key Findings from Pilot Renewable Heating and Cooling Campaigns. Carbon Neutral Cities Alliance. March 30, 2018. <http://carbonneutralcities.org/wp-content/uploads/2018/05/2.Campaign-Key-Findings-Report-1.pdf>.
- ¹⁹ Andrews, Christine. Interview by Laura Simmons-Stern and Farrah Andersen. Personal Interview. April 30, 2018.
- ²⁰ Ibid.
- ²¹ Koo, Jeremy. Bringing Renewable Thermal Solutions to New England Cities: Key Findings from Pilot Renewable Heating and Cooling Campaigns. Carbon Neutral Cities Alliance. March 30, 2018. <http://carbonneutralcities.org/wp-content/uploads/2018/05/2.Campaign-Key-Findings-Report-1.pdf>.
- ²² Koo, Jeremy. Interview by Laura Simmons-Stern and Farrah Andersen. Personal Interview. April 16, 2018.