

# BRINGING RENEWABLE THERMAL SOLUTIONS TO NEW ENGLAND CITIES

## Final Summary Report from Project Activities

### 1) **Outcomes:** Did the project achieve its intended results? Why or why not?

The project's overarching goal was to accelerate the adoption of residential RH&C technologies and help city leaders better understand the barriers and potential for driving residential RH&C adoption in their communities. In general, the project achieved its outcomes: participating cities have a better understanding of RH&C opportunities and barriers in their communities, and projects implemented by participating cities led to the installation of nearly 140 air source heat pump (ASHP) systems in homes across New England, with the potential to offset up to 130 tons of GHG emissions per year.<sup>1</sup>

Individual city projects had mixed results: while three of the five cities (Northampton, Portland, and Somerville) were able to launch successful programs, two of the five cities (Boston and Providence) encountered significant internal barriers to implementing the more extensive programs envisioned in the grant proposal, though these cities were ultimately able to complete more limited marketing and outreach activities focused on ASHPs.

The experiences of participating cities have directly informed follow-on activities from observing cities (including Cambridge, MA and Boulder, CO) and provided insights to state leaders, including the Massachusetts Clean Energy Center (MassCEC) and the New York State Energy Research and Development Authority (NYSERDA), for designing and implementing statewide programs to support similar community-level RH&C campaigns.

### 2) **Impact on lead city:** What has changed in your city or your work as a result of the grant?

- The **City of Boston** now has a more robust understanding of ideal market segments and geographical neighborhoods that are best fits for ASHPs in Boston.
- City staff have gained first-time experiences in promoting ASHPs to residents and the types of questions they face.
- The City has been able to identify the programmatic challenges in deploying and managing future preferred vendor lists.

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<sup>1</sup> The average ASHP system installed was approx. 2.7 tons in heating capacity at 5°F, expected to displace up to 60% of annual heating load for oil, propane, and electric resistance homes and 25% for gas (due to lower gas heating costs in colder weather). GHG emissions displaced will depend on customer ASHP usage behavior. Assumptions based on ISO NE 2016 marginal emissions (842 lb/MWh), EIA estimates for fossil fuel emissions, 80% AFUE for fossil fuel systems, and seasonal heating COP for ASHP of 2.5. Net added or reduced emissions from cooling not included.

### 3) Impact on other grant project team members: What has changed in the cities or other organizations of other grant participants in some way as a result of the grant?

- In the **City of Somerville**, the HeatSmart CoolSmart Somerville program helped create a foundation to expand ASHP market and increase adoption and address the over two-thirds of GHG emissions in Somerville that stem from the buildings sector. 59 air source heat pump systems will be installed as a direct result of the HeatSmart CoolSmart program. There is opportunity for two or three additional systems to be installed as a result of HSCS efforts combined with the City's Rehab Program, offering 0% interest deferred loan to income-eligible residents. The program helped raise awareness and base-level knowledge about the technology while lowering barriers to adoption across various income levels. The online HSCS sign up form was viewed nearly 3,200 times. Over the course of the sixth-month program, three workshops were attended by about 80 residents.
- **The City of Northampton** found that some of the biggest impacts from the HeatSmart Northampton program were the heightened awareness and understanding of ASHPs by key environmental advocates and the general population, and an increase in the number of early adopters, who will be able to share their experiences of living with an ASHP with friends and neighbors. Before the program started, Northampton had to educate two groups of highly-informed and highly-active climate mitigation advocacy volunteers on the existence of cold climate heat pump (ccASHP) systems, their ability to effectively heat a home in this climate, and the environmental benefits of converting even a high-efficiency gas boiler to a ccASHP. If any group should have known about ASHPs, it was this group, but they were very poorly informed. A pre-program community survey revealed that 45% of respondents were not at all familiar and only 22% were moderately or very familiar with the technology. By the end of the program the active, well-connected volunteers had become strong advocates for ASHP systems and are well-versed in the strengths and environmental benefits of these systems; residents had installed at least 54 systems, volunteers had communicated with over 1,000 residents about these systems, and the post-program survey revealed that 75% of respondents felt well-informed about ASHPs before a contractor site visit.
- **The City of Providence** found that participation in the project created a solid baseline understanding of the opportunities for RH&C. The City confirmed that ASHPs are the primary opportunity for helping the City to reduce thermal energy emissions and learned where future outreach efforts could be targeted through the market segmentation analysis. The City also initiated outreach at the 2017 Providence Community Energy Fair and established a relationship with an enthusiastic local ASHP vendor.
- **The City of Portland** learned through working with ASHP installers that events of relatively short duration that focus on a single technology are more effective than broader "energy fairs" at driving ASHP interest and adoption. Participation and interest from the vendors and the public is higher. The City also learned that the public has an appetite for information about ASHP technology, and the four events in Greater Portland were well-received. The City established an effective collaboration with Efficiency Maine, the state utility program, and believes that this program was an excellent opportunity to develop a stronger relationship with Efficiency Maine and will support future collaborations. Efficiency Maine's extensive social media capabilities were valuable for driving outreach, and Efficiency Maine was promoted as a

“trusted partner” for delivering educational content at events and for highlighting incentive programs for ASHPs and other efficiency measures.

#### 4) Follow-on work: What additional work is happening as a follow-on to the grant and who is doing this work?

- Volunteers involved in HeatSmart Northampton are planning ongoing outreach efforts to promote energy efficiency and ASHPs in targeted neighborhoods. The city expects to run more “Solarize” type programs in the future that may include ASHPs, solar PV systems and high-quality residential energy efficiency audits.
- The four municipalities (Portland, South Portland, Falmouth, and Scarborough) that participated in the Casco Bay Heat Pump Challenge expect to run a future round of the Challenge in fall of 2018.
- Somerville is reviewing HeatSmart CoolSmart results and data with the intention of utilizing the information to inform future ASHP education and promotion efforts. In the meantime, Somerville is sharing best practices with other communities and maintaining educational materials for residents.

#### 5) Funds leveraged: Have additional funds been raised for this work?

- The City of Somerville leveraged over \$10,000 of cooperative marketing funding from the two participating installers to support marketing activities in parallel with City efforts. The City of Somerville also made an additional \$5,000 in incentives available to HSCS participants.
- The City of South Portland participated in the regional stakeholder convening, was a direct contributor to Portland’s program, and contributed \$6,000 to complete a similar market segmentation of South Portland’s 1-4 family residential stock.

#### 6) Other impacts: What other grant impacts are you aware of on CNCA members, partner organizations, or anyone else?

- The City of Portland directly engaged neighboring municipalities (South Portland, Falmouth, and Scarborough), as well as the Greater Portland Council of Governments and Efficiency Maine as key partners for designing and implementing the regional Casco Bay Heat Pump Challenge.
- The City of Cambridge, which served as an observer city on the project (particularly on meetings in Q2 of 2017 involving neighboring Boston and Somerville), deployed a modified version of the Activity 2 market segmentation analysis methodology to complete a similar analysis internally, leveraging a fellow from the UNH Sustainability Program.
- The Massachusetts Clean Energy Center (MassCEC) participated in the Activity 1 regional stakeholder convening; supported outreach to installers and provided data from MassCEC’s rebate programs for Massachusetts-based campaigns; and participated in installer review and interviews as an observer with the City of Somerville. This participation directly informed the launch of MassCEC’s HeatSmart Pilot Program in late 2017, which is supporting similar pilot outreach, education, and group purchasing

campaigns for RH&C involving seven Massachusetts towns. In particular, MassCEC's HeatSmart Pilot Program included market segmentation analyses for each of the participating communities and greater outreach to not just installers, but also manufacturers, distributors, and industry groups to encourage installer participation in the program.

- ⦿ Residents of Great Barrington, MA, visited a Northampton HeatSmart open house and communicated with city staff and volunteers for advice on planning their own HeatSmart program. Great Barrington has since been awarded one of the four grants for MassCEC's pilot HeatSmart program.
- ⦿ Northampton's program directly resulted in the installation of four ASHP systems in homes in neighboring towns, indicating that the program outreach had a wider area of impact than just the city.
- ⦿ The City of Boulder (observing) coordinated a group of additional cities (New York City, Burlington, and Washington D.C.) to conduct similar market segmentation analyses through a CNCA/Summit Foundation-supported "Thermal Decarbonization Initiative for Cities" project in 2017.
- ⦿ Participating cities were invited to the "Going to Scale" convening sponsored by the Rockefeller Brothers Fund and USDN, and to share lessons learned from and participation in this project and provide input on the development of a broader city-industry collaborative initiative for accelerating heat pump deployment. Representatives from all five cities except for Portland were able to attend.

## 7) **Lessons learned:** What are 2-3 key lessons learned from this project for how to advance practice on the grant topic or how to improve the Innovation Fund?

- ⦿ **Flexibility in the campaign model is necessary to address local city needs.** While the participating cities all worked from a starting point of the Solarize model for designing their campaigns (and four of the five cities had previously run a Solarize campaign), modifications to this model were necessary to address the needs of individual cities. The three major campaigns that were implemented were successful, driving the installation of nearly 140 cold climate ASHP systems.
- ⦿ **Ensuring availability of city staff capacity for project implementation is critical to the success of Innovation Fund-supported projects.** Providing funding to augment city staff capacity as part of future funded projects can be valuable to ensure that all project activities can be completed in capacity-constrained city sustainability and energy offices with more limited resources. Providing stipends to city offices or requiring a budget set-aside to support city staff time (e.g. hiring of interns, grad student fellows, etc.) could be valuable for future projects.
- ⦿ **Cities should consider conducting significant local contractor engagement prior to designing and implementing outreach and group purchasing campaigns.** Bringing the Solarize model to RH&C technologies requires adapting not only marketing and education approaches, but also engagement of HVAC contractors, which can operate under very different business models and have less familiarity with community-based clean energy efforts. Three of the four cities that put out a solicitation for contractors had no or fewer-than-expected responses. Prior to launching such campaigns, cities should consider doing more local supply chain outreach (e.g. contractors, distributors, manufacturers, industry groups) to communicate the goals of the program and benefits of participation, as well as get contractor input on how to modify key program components to better meet the needs of the local supply chain.

- ⦿ **Cities should expect engagement with Inspectional Services regarding permitting requirements.** Requirements for permitting and inspection vary greatly between communities and states. As RH&C technologies are not as ubiquitous as other heating and cooling systems, these requirements are not as widely understood and there can be confusion across city staff about what the requirements are. An in-person conversation prior to the launch of a campaign between installation partners, city implementing staff, and permitting staff is necessary to create a streamlined process and help ensure that all requirements are clearly understood and communicated between relevant staff and installers, and therefore clients. Even where streamlining is not possible, ensuring that requirements and added costs can be effectively communicated to customers is critical for transparency and program success.

## **8) Grant Products: Provide a bullet-point list of all of the “products” produced from the grant.**

### **Activity 1 (Regional Stakeholder Convening)**

- ⦿ Stakeholder convening agenda and slides
- ⦿ Key findings memo from stakeholder convening

### **Activity 2 (Analysis of local markets)**

- ⦿ Market segmentation analyses for each of the five cities, including cleaned databases of 1-4 family buildings ranked for each RH&C technology and maps providing visualizations of technology indices and key housing indicators. Methodology detailed in the Activity 2 report.
- ⦿ Qualitative research project exploring insights and awareness of ASHPs among a subset of homeowners in each of the five cities, described in detail in the Activity 2 report.
- ⦿ Section of Activity 2 report discussing “soft costs” associated with RH&C technologies and potential actions cities could take to streamline local regulations and reduce soft costs.

### **Activity 3 (Design and implementation of outreach campaigns)**

- ⦿ The Casco Bay Heat Pump Challenge, HeatSmart Northampton, and HeatSmart CoolSmart Somerville were directly supported by the project. Additional educational content and inclusion of ASHPs in Renew Boston outreach and the Providence Energy Fair were also supported by the project.
- ⦿ Marketing and educational materials developed for each program; RFQs and RFPs issued to solicit contractors for city-led programs.

### **Activity 4 (Post-outreach campaign program evaluation)**

- ⦿ Post-program survey results developed for Somerville, Northampton, and Portland.<sup>2</sup>
- ⦿ Report detailing key findings from outreach campaigns

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<sup>2</sup> Note: Installers participating in the Casco Bay Heat Pump Challenge were inconsistent in collecting email addresses of attendees, and thus there was an insufficient base of participants available for a post-program survey. Additionally, response rate to Somerville’s survey was low, with only 6 of 212 participants who signed up for site visits responding to the survey.