Pioneer Valley Habitat for Humanity®

All-Electric Homes Homeowner Survey

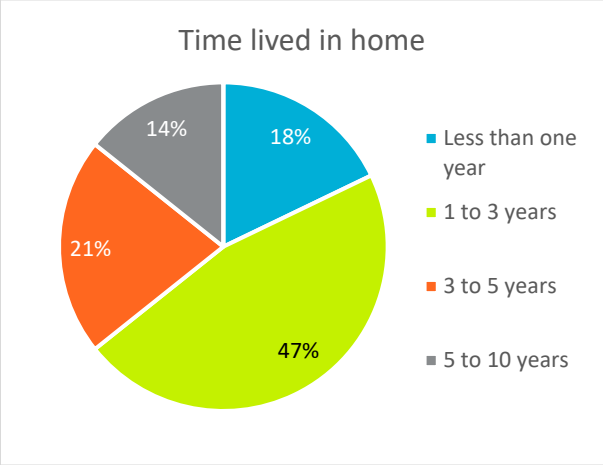
MASSCEC EmPower Innovation Grant
September 2023

Introduction

The goal of this project is to realize the potential of all-electric homes for low-income first-time homebuyers who are working with Habitat for Humanity affiliates across the state of Massachusetts. Habitat for Humanity affiliates build dozens of new homes each year and building practices vary from affiliate to affiliate. This survey asks questions of current Habitat homeowners in all-electric homes on the following topics:

1. Equipment usage and maintenance, including basic knowledge of their systems and overall satisfaction
2. Energy costs, including the presence of solar or enrollment in subsidized utility programs
3. Education provided by Habitat during the construction and early stages of life in their all-electric home

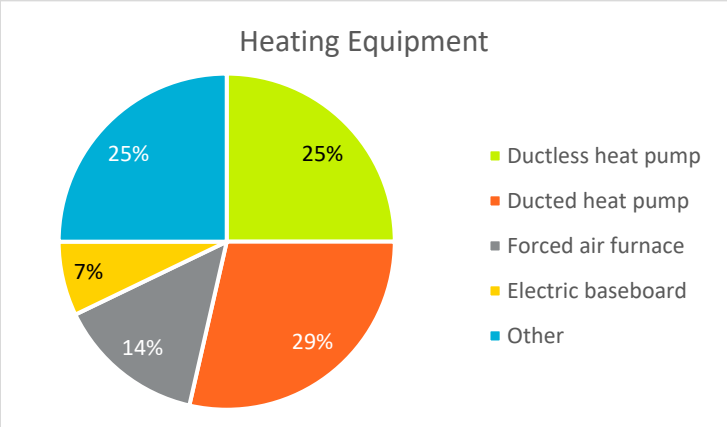
Twenty-nine current Habitat homeowners completed this survey, representing at least 12 different towns in Massachusetts (not all homeowners provided address information). Responses from homeowners who provided information indicating they may not live in an all-electric home were removed from the final data. All homeowners who completed the survey had the opportunity to request a gift card as a thank-you for participating.

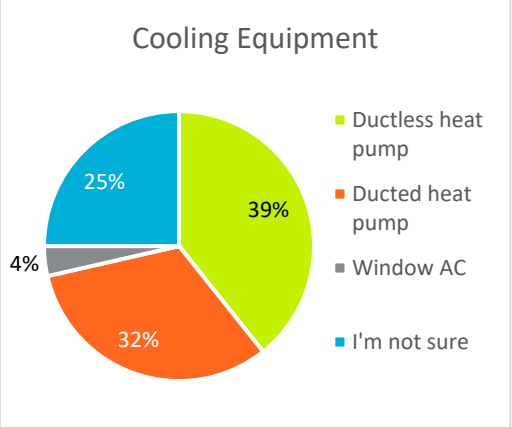


Affiliate Area	Reported Towns
Cape Cod	Brewster, West Harwich
Central Berkshire	Pittsfield
Greater Springfield	Holyoke
North Central	Ashburnham
Pioneer Valley	Amherst, Easthampton, Florence, Greenfield, Pelham, Shutesbury
Plymouth	Mattapoisett

Equipment Use & Maintenance

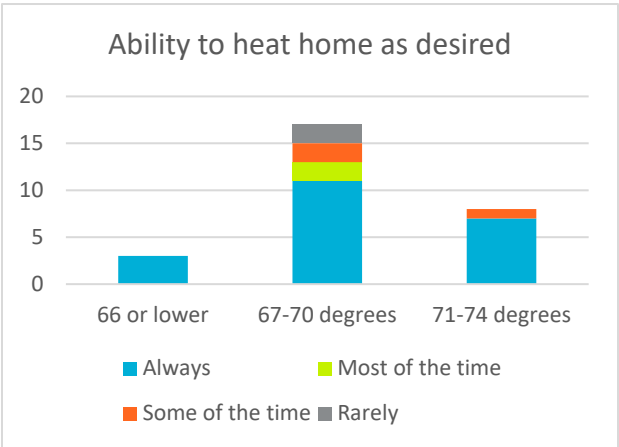
The trend in Habitat homes over the last several years has been toward ducted or ductless heat pump systems for both heating and cooling, as they are efficient, all-electric, and work well at the smaller scale of most Habitat homes. Given that most respondents are homeowners whose homes were completed within the last five years, this trend is mirrored in the results: 54% use air source heat pumps (ducted or ductless mini splits), 25% use another option, and 21% use forced air or electric baseboard. Most homes (89%) did not have backup heat sources. Cooling equipment totals are similar, with 71% using air source heat pumps to cool their homes, and most (96%) not using any backup cooling sources.

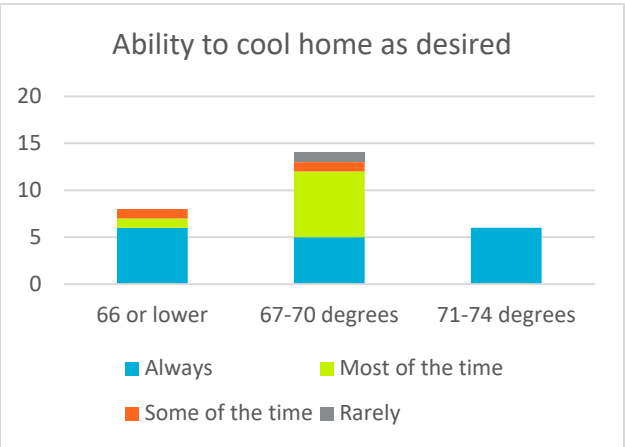




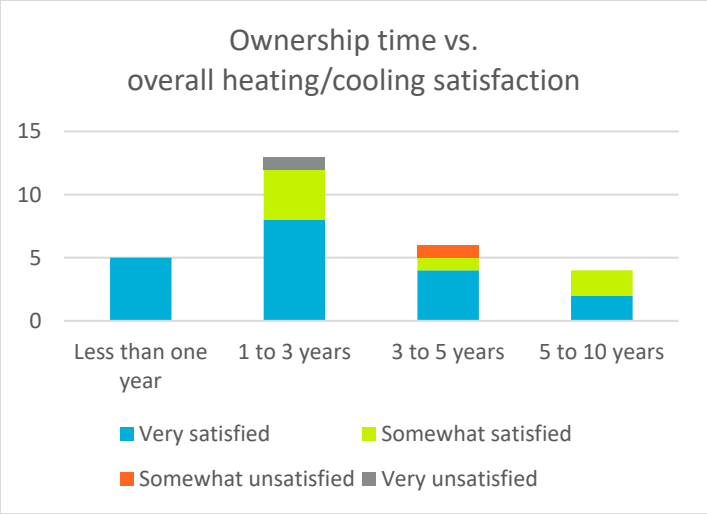
These are self-reported by the homeowner and inconsistencies may reflect a lack of understanding of the installed equipment.

Homeowners report generally being able to heat and cool their homes to their desired temperatures, indicating that the need for secondary heating or cooling sources isn't present. Even those who prefer a hotter house in winter and cooler in summer largely report an ability to always achieve their desired temperature.



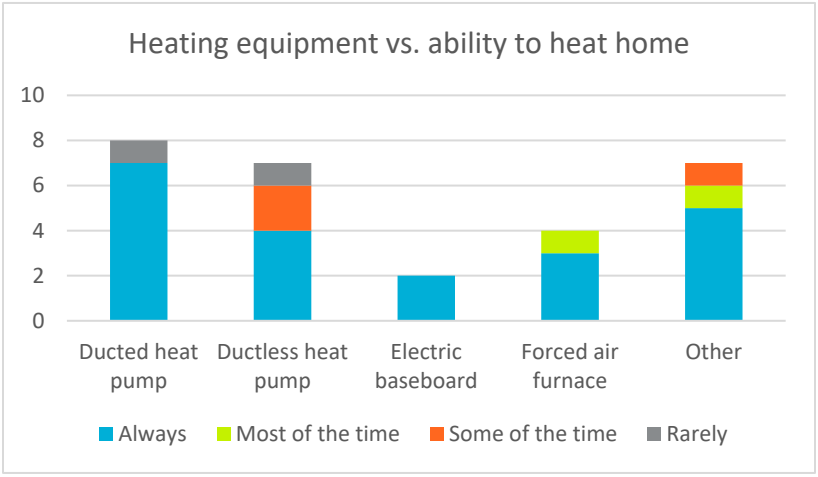


Adequately heating all rooms is often a homeowner concern as well, given the limited blower head placement of ductless systems, but 78% of homeowners report being somewhat or very satisfied with heat distribution. Most homeowners (79%) also set and leave their thermostat, rather than adjust it daily. **Overall, 92% of homeowners report being somewhat to very satisfied with the heating and cooling of their homes.**

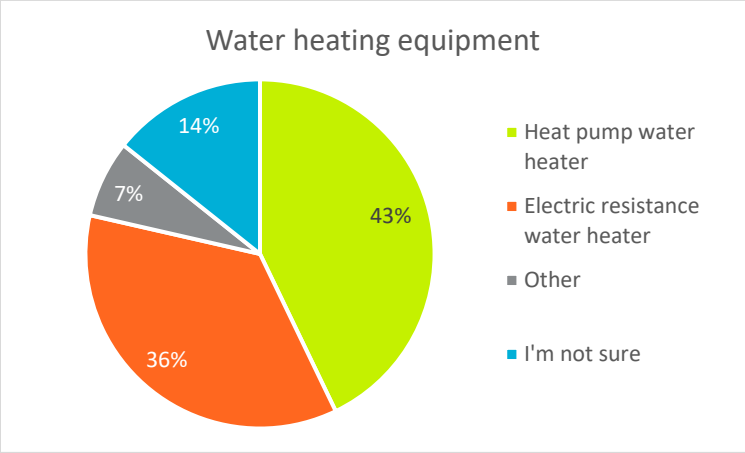


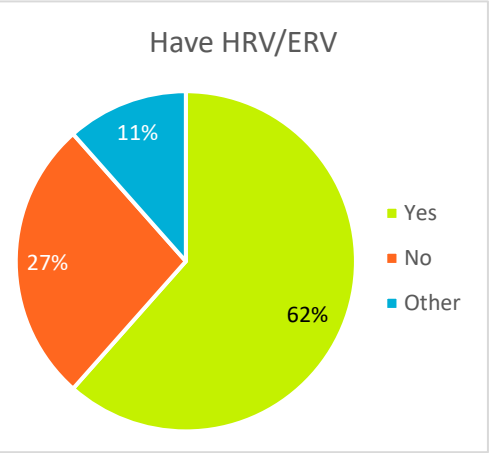
Overall satisfaction with home heating and cooling does also seem to have a slight correlation with length of ownership time; survey results include both more responses and higher percentages of somewhat or very satisfied responses within the last three years. This could be attributed to improvements in the technology of all-electric systems and/or homeowner education over the last ten years. There also have been increased numbers of Massachusetts affiliates building all-electric homes within the most recent five years, so a higher response rate of homeowners within that time is also expected.

There is not a strong correlation between the type of heating equipment and homeowner ability to heat their home to a desired level. While ducted heat pumps are favored over ductless in these results, both still have detractors. In terms of satisfaction, **87%** of those with heat pumps were somewhat or very satisfied overall, with ducted heat pumps again favored at **88%** very satisfied to ductless heat pumps **43%** very satisfied.

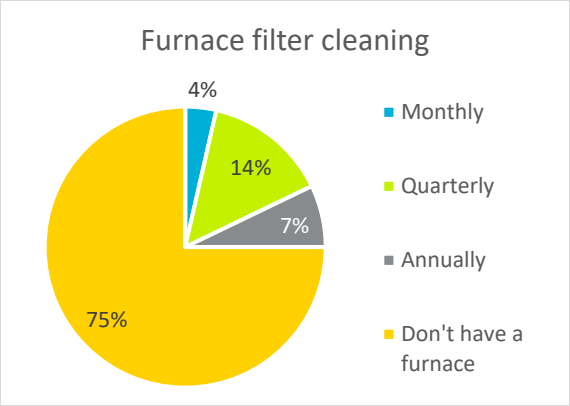


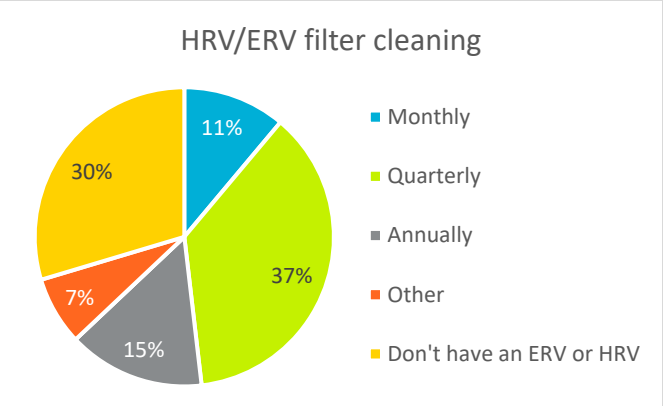
Heating and cooling are the most present issues for homeowners, but many all-electric Habitat homes also have new hot water heaters and HRV/ERV systems that may be equally as unfamiliar to homeowners as a heat pump. While the impacts of water heating and ERV/HRV equipment may be less obvious in day-to-day life in an all-electric home, having energy efficient options helps keep a home healthy and comfortable.

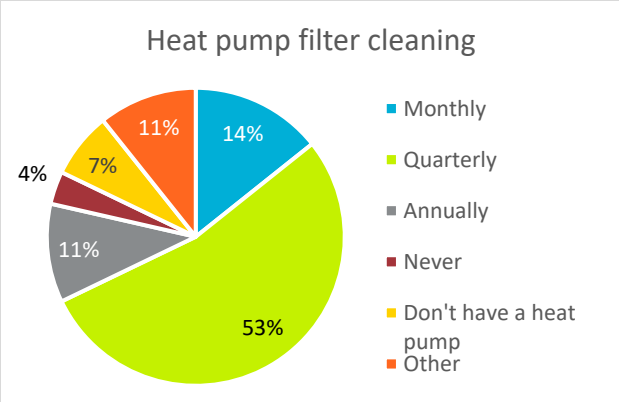


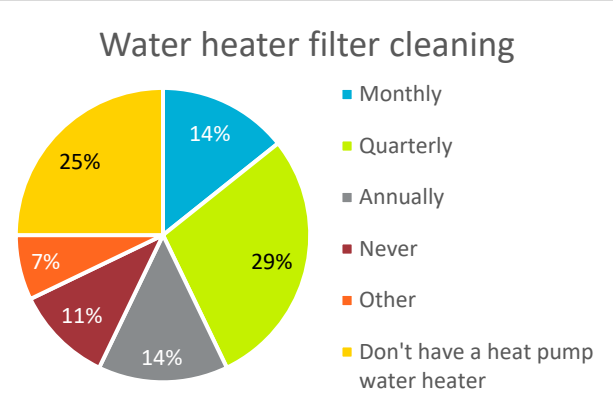


Maintenance of these systems (often new to the homeowners) is an area where many respondents expressed difficulty. Filter cleaning is one maintenance task that homeowners can often accomplish themselves, and the frequency at which they do varies widely both within and across systems. Most homeowners report that they clean filters on their various systems quarterly.

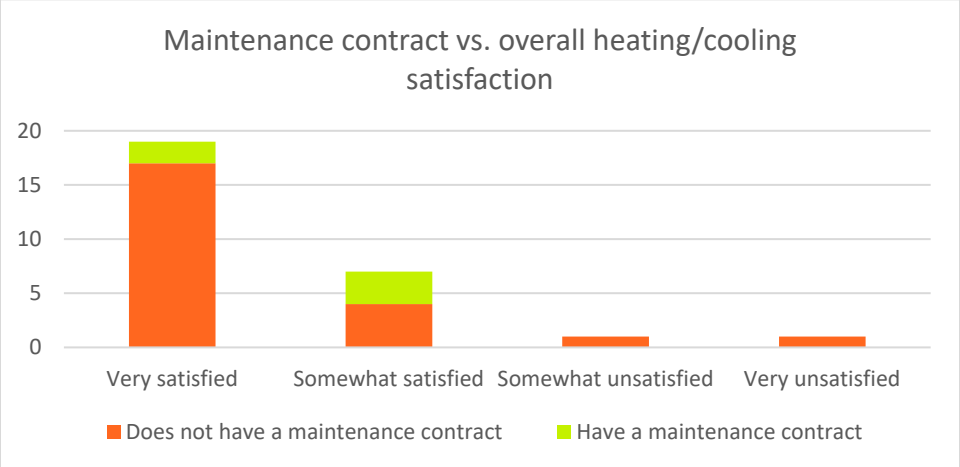








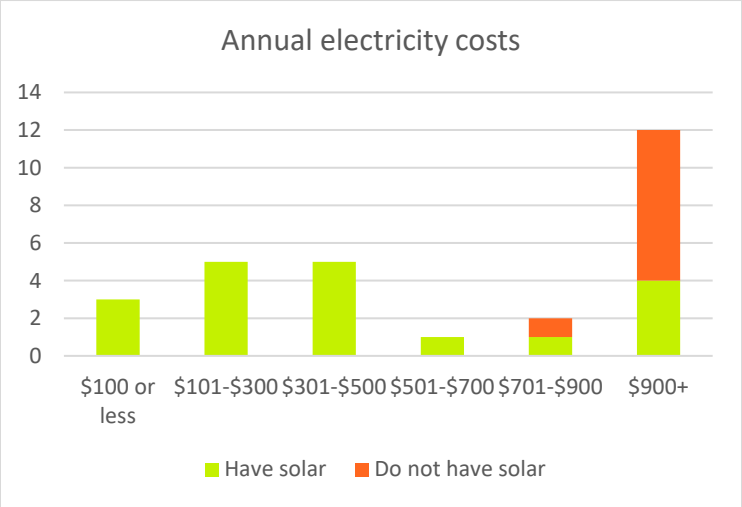
Only **18% of homeowners report paying for a maintenance contract** with a professional technician to service their heating or cooling systems annually. Given the small sample size, it is hard to say if having a maintenance contract increases overall satisfaction with their heating and cooling system (though all respondents with maintenance contracts reported being somewhat or very satisfied overall). While they represent an extra cost, annual professional service can prolong the life of their systems and ease the burden on the homeowners of learning how to maintain these new systems.



Energy Costs

Keeping energy costs reasonable is key to ensuring that homeownership remains affordable long-term, especially for individuals and families with low incomes. Solar panels can help alleviate the burden of fluctuating energy costs for all-electric homes, with summer surplus balancing out the higher energy usage during colder Massachusetts winters. Habitat homeowners also likely qualify for state or utility-run fuel assistance programs to further decrease cost burdens. Of survey respondents, commentary falls into similar positive and negative experiences:

- Those with a positive experience report that solar panels cover most, if not all, of their annual utility bills
    - Find their all-electric homes very affordable
    - Appreciate only needing to pay one utility bill
- Those with a negative experience report disappointment that their all-electric home has utilities beyond what they were told to expect
    - Homeowners were told utility costs would be minimal, which does not match their experience
    - They are unable/unsuccessful in accessing fuel assistance, and thus remain cost-burdened



Homeowners without solar PV generating electricity face significantly higher cost burdens for their all-electric home than homeowners with solar. Even among those who still spent $900 or more annually, those who had solar report expenses under $2,000, whereas those without solar report spending more. Given that Massachusetts has some of the highest electricity prices in the nation, higher bills are expected for those without solar. **Overall, 81% of homeowners describe their energy bills as manageable or very manageable in their energy-efficient homes.**

As part of general homeownership preparedness, 57% of homeowners report having received an estimate of their future energy costs from Habitat. Of those, 61% report the estimate was accurate to their experience. This could partially be due to rapidly rising electricity costs over the 2019-2022 period, or reflect either inaccuracies in the estimates provided or inefficient use of their homes' systems.

Homeowners may also enroll in other cost-saving measures for their utility bills: 21% report being on a budget plan with their electric company to pay the same amount every month, and 55% are enrolled in a lower-cost electricity program for families with low incomes. However, 17% of homeowners indicated not knowing whether their utility offers any cost-saving programs, which may reflect a gap in education provided by affiliates. One homeowner indicated being denied access to their utility's assistance program, which may similarly be an area that affiliates could intervene in to assist.

Homeowner Education

Energy-efficient and all-electric equipment is often new to homeowners, and can present a significant learning curve around use and maintenance. Thorough homeowner education in advance of the home sale can help ensure that homeowners are maximizing the benefits of their equipment.

Of those surveyed, **89% reported that their Habitat affiliate had discussed the energy efficiency features of their home during the construction or pre-closing process.** However, many indicated that these trainings would be more beneficial if they took place (or had follow up visits) when the homes were completed and homeowners better understood day-to-day operations of their systems.

Ongoing maintenance stands out as the area that current homeowners have the most questions about, and many offered suggestions to improve the education they received from Habitat:

- Additional information on ongoing maintenance
    - Follow up visits once the home is occupied to assist with understanding the operation of systems
    - Maintenance workshops/lessons after homeowners have some experience with day-to-day use
    - Additional guidance on solar systems
- Thorough utility estimates and updates on any changes to build plans during the construction process
- Manuals for both general homeownership and the systems in their homes

Homeowners also shared thoughts around what would improve their experience living in an all-electric house:

- “Larger roof overhangs with the passive solar windows. We use room darkening curtains in the summer.”
- “Weather proof windows, more insulation, better placements of units”
- “I'd like my next vehicle to be electric, so I dream of having this while being able to charge it at home by way of solar. In the long-term, it'd be great to also have a battery to store power and have the option of grid-free power. Really though, this is just an incredible gift to be free of fossil fuels and its cost. I never had AC before owning this home and am now able to enjoy it guilt-free.”
- “Better air circulation throughout the house to help with even temperatures in the rooms.”
- General commentary on wanting solar panels or better training around their solar panels

Lastly, homeowners had many reasons to love their homes:

- “Having the safe place for my kids where they can grow”
- “Everyone has their own bedroom and the solar panels.”
- “I love that it is a place for myself and my children to call home, and that we are able to make it our own.”
- “Low maintenance, very low cost, very comfortable & very pretty.”
- “The heat and A/C. Our previous home was not fully insulated and we watched it go out poorly insulated or not insulated walls and windows. It feels real nice to be warm in the winter and cool in the summer.”
- “That I have an affordable home to live in. Having a fully electric house helps keep the mountains of bills down and helps me create a better budget.”
- “How can I summarize this to one single thing? Probably going to say that my favorite thing is that it's negative net zero, clean, green energy and well-insulated.”
- “Everything, it’s home.”