

Lessons Learned from a Small Diversity-focused Project: Installing Heat Pump Water Heaters in Black-owned Homes in Portland

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ABSTRACT

Throughout 2021 we engaged in a small diversity-focused project seeking to help those who are historically energy burdened in our community. To bring forward more efficient solutions to those who need it most, we partnered with a local non-profit to fund and manage the installation of seven heat pump water heaters in Black-owned homes. Following installation, we requested interviews with participants to better understand their experience and uncover any important themes for future efforts. This micro-project provided important lessons in equitable project design and delivery that can be extrapolated to a larger, program-sized effort. Several notable lessons-learned included:

- Outreach should focus on engaging trusted community members within target groups, both in traditional and virtual spaces.
- Program implementers should themselves be members of the target community or have cultural sensitivity training.
- While cost-effectiveness may be the preferred method for programs to determine benefits, it may not be the best metric to use when assisting energy burdened communities.

As the national push to reduce fossil fuels finds its way into utility programs, moving the needle on efficiency, equity, and electrification means programs cannot always operate the same way as before. This paper will explore the ways in which programs and state policy need to adapt and think critically about messaging and engagement tactics with traditionally underserved communities. We will synthesize our lessons learned and challenge the audience to think through non-traditional strategies for engaging different minority groups than the paths utility programs have commonly taken.

Introduction

Much of our work at Energy 350 involves delivering and evaluating utility energy efficiency programs. While we deeply value and believe in these programs, we recognize they are not always equitable if we look at them through an energy justice lens.

Energy injustice stems from racial, economic, and social inequity. Those experiencing energy injustice are more likely to live in older, energy-inefficient homes and apartments. These conditions lead to increased energy costs and a decrease in basic comfort. In addition to higher utility costs, energy injustice affects the physical and mental health outcomes of those living in these conditions, which only makes escaping the cycle more difficult (Lewis, Hernández, and Geronimus 2019).

For a myriad of reasons, those suffering from energy injustice are less likely to participate in energy efficiency programs. In this report, we refer to those suffering from energy injustice as underserved populations.

Widespread, systematic change will require a unified legislative effort to transform the way energy is generated, transmitted, and delivered to homes. We are not claiming to be making a dent in this effort, although we are certainly here for it. Energy 350's "No Justice, No Peace" team took on a mutual aid project locally in Portland.

This paper presents project results and challenges, and then describes lessons learned. In the Lessons Learned section of this report, we partnered with C+C, a communications and marketing agency that is centered around making the world better. Their team specializes in marketing campaigns reaching diverse communities. Finally, the last section presents a utility perspective.

About the Project

Project Overview

At Energy 350, our work focuses on energy efficiency in buildings and industry. We diversify our impact beyond energy and the environment through financial contributions from the company and individual staff. In seeking out a way to help our local community while doing what we do best, we explored the idea of serving homes whose owners are more unlikely to participate in utility program offerings due to historical injustices. We partnered with Randal Wyatt, Founder and Executive Director of Taking Ownership PDX, to fund 100% of the installation of energy efficient heat pump water heaters (referred to as HPWHs) in local Black-owned homes that have requested our help. To make the most of the opportunity to engage with homeowners, we also offered LED light bulbs and low flow fixtures to capture easy energy savings opportunities.

We were given a materials and installation budget of around \$20,000 from Energy 350 leadership, with the understanding that there will be additional internal labor expenses for the design and delivery of the project. We first connected with Wyatt in January 2021. In April 2021, Wyatt sent an email with an attached flier advertising free HPWHs to his network of Black homeowners, and we immediately began selecting participants. We began reaching out to contractors in April and continued building our contractor network throughout 2021. We selected a plumber and began installations at the end of June 2021. In February 2022, we completed the seventh and final installation.

With this effort we aimed to: remove barriers present in traditional energy efficiency programs, reduce monthly electricity bills, provide reliable hot water, take a small step toward restorative justice, and, in the end, help out a neighbor.

Project Results and Challenges

Heat pump water heaters are significantly more efficient than typical electric water heaters, cutting electricity usage by two to three times compared to a standard electric water heater. Among our participants, the upgrade saved each household approximately \$177 - \$205 per year.

Here is a summary of project results by the numbers:

- 99 Black-owned households received emails sent by Randal Wyatt to Taking Ownership PDX participants
- 12 responses
- 7 heat pump water heater installations
 - 4 electric baseline water heaters replaced
 - 3 natural gas baseline water heaters replaced
- 5 responses did not result in installations: 2 due to ineligibility¹ and 3 due to complicated installations²
- 72 assorted LED light bulbs provided to replace incandescent and fluorescent bulbs³
- 17 faucet aerators and low flow shower heads provided
- \$2,901 average materials and installation cost per household
 - \$1,897 lowest cost (50 gal, easy installation)
 - \$4,757 highest cost (80 gal, complicated installation)

Funding came from three sources: 1) Energy Trust of Oregon, which provided an instant rebate of \$550 per electric baseline water heater, 2) Energy 350, which provided project management labor, covered all materials and plumbing costs, and purchased low-flow fixtures and LEDs, and 3) Taking Ownership PDX, who covered electrical upgrade costs for homes that had existing natural gas water heaters.

Cost-Effectiveness

We calculated energy savings for each of the seven installations using the Regional Technical Forum (RTF) HPWH calculated measure workbook. The RTF method uses regional building stock data to estimate existing equipment performance based on home water use patterns, water heater location, and occupancy.

Table 1 summarizes the simple payback for the four installations with existing electric water heaters. We chose to present the payback calculated using an incremental cost. The incremental cost assumes the homes would have required a new electric resistance water heater baseline. The incremental cost is calculated by subtracting a baseline new electric resistance heater cost (installed) from the actual installed cost. The incremental payback for homes with existing electric water heaters ranges from 5.3 years to 21.0 years, with an average of 10.6 years.⁴

¹ Ineligibility was due to natural gas baseline water heaters. Later in the project we changed eligibility requirements to include natural gas baseline water heaters.

² Two of the complicated installations were due to height clearance issues. In these instances, relocating the HPWHs would have been too complicated and expensive. The other complicated installation required major piping infrastructure repair and water damage remediation before the plumber would do the work.

³ We did not include energy savings from LEDs in this report's analysis.

⁴ Payback includes a \$550 midstream incentive per HPWH.

Table 1. Payback Calculation for Homes with Existing Electric Water Heaters

ID	No. of occ.	Existing WH Type	HPWH size, gal	Install location	Incremental cost	Energy savings, kWh/yr	Cost savings, \$/yr	Incremental payback, yrs
1	2	Electric	50	Interior (laundry)	\$1,094	1,675	\$205	5.3
2	4	Electric	65	Garage	\$1,494	1,451	\$177	8.4
3	3	Electric	65	Basement	\$1,497	1,453	\$178	8.4
4	5	Electric	80	Basement, Ducted	\$3,726	1,453	\$178	21.0
Totals					\$7,810	6,032	\$737	10.6

Table 2 details the simple payback for the three installations that had existing natural gas water heaters. For these cases, RTF suggests using an incremental approach assuming the homes would have received an electric resistance water heater baseline.

The incremental cost includes equipment, plumbing, and electrical costs for an electric resistance baseline water heater, subtracted from the actual electrical labor and materials cost. The average payback is 9.1 years.

Table 2. Payback Calculation for Homes with Existing Natural Gas Water Heaters

ID	No. of occ.	HPWH size, gal	Install location	Total cost	Baseline system cost	Incremental cost	Energy savings, kWh/yr	Cost savings, \$/yr	Incremental payback, yrs
5	6	65	Attic	\$2,797	\$1,372	\$1,425	1,453	\$178	8.0
6	6	65	Basement - Ducted	\$2,905	\$1,372	\$1,534	1,453	\$178	8.6
7	4	65	Garage	\$3,237	\$1,372	\$1,865	1,451	\$177	10.5
Totals				\$8,939	\$4,116	\$4,824	4,357	\$533	9.1

The overall average payback for all seven installations is 10.0 years. However, this does not include project management costs incurred by Energy 350, which amounted to around \$20,000. Much of these costs were required to develop the program and find plumbing and electrical contractors. We estimate that in steady state, this program would require approximately one hour of project management time per participant. Including these estimated project management costs brings the overall payback to 10.6 years.

Challenges

Along the way, we noted several challenges in the design, startup, and implementation of this program. We learned and pivoted our approach with an overarching goal in mind: engage an underserved community with energy efficiency while providing a good experience. We had other, secondary goals, like figuring out how to scale up to make a greater impact, connecting with minority contractors, and providing cost effective energy savings.

We describe in this section six major challenges encountered over the course of the installs; some we anticipated from the start, while several required a major pivot in our approach. For example, we anticipated from the start that partnering with an existing community-based organization would be our best chance at reaching underserved homeowners. However, we did not anticipate how long it would take to find licensed contractors willing to do this work. The latter challenge slowed our progress and required several interventions.

Challenge 1: Reaching an underserved community. Our first challenge was to narrow our focus on an underserved group of homeowners. We tapped our existing contacts in the Portland area and focused on Taking Ownership PDX as a partnership possibility. Wyatt responded quickly to our initial email and expressed interest in partnering with us. Since Taking Ownership PDX works with local Black homeowners, we narrowed our project focus to serving local Black homeowners. Wyatt was an invaluable resource to both learn from and work with throughout the project. Partnering with Wyatt was critical to this project's success.

Challenge 2: Minimizing hurdles for non-profit/community-based organization partnership. We aimed to minimize hurdles in our partnership with Taking Ownership PDX in the same way we aimed to minimize hurdles to homeowners. Primarily this meant our team would handle logistics and coordination with programs, equipment, and contractors. Wyatt was extremely busy juggling many aspects of his organization and did not have time to take an active project management role. He took a significant role in the beginning to email his homeowner contacts and then relied on Energy 350 to run with coordinating the program. Energy 350 checked in at key points along the way, and Wyatt provided valuable feedback and insight along the way about many aspects of the project, including homeowner feedback and scheduling logistics.

Challenge 3: Determining eligibility. While we were careful to reduce barriers to participation, we elected to have three core eligibility requirements at the onset of the program:

- *Existing water heater must be electric.* We wanted to ensure the homeowner would see a reduction in their electric bill. In addition, having an existing 240V connection would simplify the installation.
- *Existing water heater is greater than seven years old or is broken.* We wanted to prioritize installations that would realize the maximum benefit.
- *Installation space meets clearance and ventilation requirements specified by equipment manufacturer and local ordinances.* This is a physical space requirement for HPWHs. We did not want to void manufacturer warranties or have to extensively modify existing areas.

In the end, we discovered through talking with homeowners that energy efficiency is not the main driver behind their interest in participating. The main drivers were receiving reliable hot water and eliminating the worry of a looming capital expense. As such, we removed the first eligibility requirement for an electric water heater baseline.⁵ We also eliminated the second

⁵ When we removed the electric baseline requirement, we had already deemed two applicants ineligible. We did not have enough budget to reverse this decision.

requirement because we found it was superfluous; no one with a newer water heater applied to participate in this program.

Challenge 4: Vetting participants. In the initial flier that Wyatt sent out to his Taking Ownership PDX network, we asked participants to determine eligibility themselves. In addition, we asked them to send us two pictures of their water heater: one which zoomed in on the nameplate and one which zoomed out to show the area where it was installed.

Although we did not expect potential participants to have a similar level of energy awareness as an energy efficiency program implementer, we realized we asked too much. The level of detail provided by participants was mixed. In the end we determined that all we truly need initially is interest in the program and a contact phone number. Having two simple requirements increased access further.

After initial interest was determined, there were two points of contact required for each installation: 1) an initial phone call, and 2) a site walkthrough by the plumber. In the initial phone call, we gathered home characteristics and existing water heater details. We used the initial call to explain to the participant what a heat pump water heater is, differences they will encounter compared to their existing water heater (noise, cold exhaust air, condensate, etc.), and answer any questions. Sometimes follow-up was required, but we found that additional follow-up was minimal once the relationship was established through the phone call. After the phone call, we connected the plumber to the participant and they conducted the site walkthrough. The site walkthrough determined size, feasibility, any special installation requirements, and cost.

Challenge 5: Complicated Installations. Due to energy injustice, our target population lives in older and less energy efficient homes (Lewis, Hernández, and Geronimus 2019). Due to social injustice, our target population has less generational wealth to invest in their homes. In older homes, upgrades can become complicated because changing one thing, like a water heater, could have cascading consequences for other systems. We found this to be the case for most participants in this program.

To add to the challenge, HPWHs are not always plug-and-play. The HPWH available on the market in 2021 is taller than a standard water heater. Condensate must drain into an existing drain or outside. If the HPWH is installed in an underground basement, a condensate pump may be required. If the location of the water heater is in an occupied space, then noise and cold air exhaust must be considered. A vent may need to be installed to exhaust air outside. If the water heater is installed in a closet, then door vents may need to be installed.

Although these challenges are not new to HPWH installs, they do present barriers to both participation and interest. We overcame the hurdle of complicated installations in all but one instance. One applicant had corroded pipes with many leaks and a spider infestation that prevented the plumber from moving forward. Unfortunately, too much remediation work was required in the crawlspace before the water heater could be installed.

Challenge 6: Availability of licensed contractors. We consider this our biggest challenge; the challenge that almost brought our efforts to a standstill. Since this was a diversity-focused project, we prioritized diverse contractors. Portland, Oregon suffers from a small pool of diverse contractors. We knew at the onset that we would have to try hard to find diverse contractors. We spent many hours researching potential contractors online, asking our network of homeowners, and tracking down leads.

Our water heater supplier pool was limited to Energy Trust vendors or retailers that provide the instant rebate. We were somewhat hurried to find a supplier because prices were increasing and the rebate was ending, so we purchased seven water heaters from GP Conservation, who is not a diverse contractor.

One lead produced a Black-owned plumbing contractor who expressed reservations because they were not familiar with HPWHs but agreed to do the work as long as we supplied the water heaters. After about two months of working with this plumber, it became clear that it was not going to work out. After a few weeks of coordination, the plumber expressed that they were too busy with other life commitments to continue. Feeling pressed for time as recipients were ready to receive their new water heaters, we abandoned our mission to work with a diverse plumbing contractor. We selected Great Northwest Installations, who is a partnering firm with GP Conservation and is not a diverse contractor.

An additional complication arose when we decided to include natural gas baseline water heaters, which then required an electrician. We elected to prioritize diverse electricians, but not limit our search. Ultimately, it took us months to find an available and willing licensed electrician, who we found through Wyatt's contacts and who is a Black-owned business.

Community Nonprofit Perspective

We interviewed Randal Wyatt of Taking Ownership PDX on April 20, 2022. This section summarizes Wyatt's perspective as a community nonprofit organization working with Energy 350 on this energy efficiency project.

Mission. Taking Ownership PDX's mission is to provide free repairs for Black-owned homes and small businesses in Portland to deter predatory and racist practices that lead to displacement. For example, the Portland Bureau of Development Services issues liens for property maintenance violations based on complaints. Complaint-based enforcement disproportionately affects Black folks living in neighborhoods vulnerable to gentrification (Portland 2021). If liens are not paid within 365 days, the property is placed on the City of Portland's pre-foreclosure list.

Energy efficiency comes into play because another piece of their mission is to make houses healthier. Wyatt wants to make sure resources are accessible to Black Portlanders to improve the health of their homes. He sees cost efficiency and environmental impact as two important additional benefits to healthy homes.

Barriers. Wyatt described three barriers to his mission: funding, accessibility of materials and contractors, and lack of education around critical race theory.⁶ While he does well with fundraising, the problem is so large that it can feel like he's putting a Band-Aid on a giant wound. He says that if the Taking Ownership PDX model becomes contagious and has widespread adoption, as a society we could start making a dent in the problem.

Accessibility of building materials is a problem that has been exacerbated by increased demand and supply chain issues caused by the COVID-19 global pandemic. Wyatt compared

⁶ Critical Race Theory, or CRT, is an academic and legal framework that denotes that systemic racism is part of American society — from education and housing to employment and healthcare. Critical Race Theory recognizes that racism is more than the result of individual bias and prejudice. It is embedded in laws, policies and institutions that uphold and reproduce racial inequalities. According to CRT, societal issues like Black Americans' higher mortality rate, outsized exposure to police violence, the school-to-prison pipeline, denial of affordable housing, and the rates of the death of Black women in childbirth are not unrelated anomalies (LDF 2022).

wood to gold. Ideally, Wyatt would like to assemble a team of plumbers, electricians, carpenters, and other licensed contractors to work for Taking Ownership PDX. Until funding is available for that growth, he has been subcontracting all work. The organization has a large waitlist. With these barriers, projects take a long time from procurement of materials to scheduling a subcontractor, and the final product quality is variable.⁷

Finally, Wyatt described a barrier caused by a lack of education around critical race theory. He says that some people simply do not understand why and how gentrification uniquely impacts the Black community in Portland. This presents itself as opposition from people in other communities in the city and could be a barrier to obtaining funding. For example, he is often asked why he doesn't serve low-income homeowners regardless of race. He has been criticized for maintaining a narrow focus on Black homeowners. Lack of education around critical race theory is also a worry when partnering with other organizations. He is protective of his participating homeowners; a partner that does not understand the symptoms of systematic racism could do damage to participating families.

Experience with Energy Efficiency Programs. We talked to Wyatt about making other partnerships in the energy efficiency space. He has a desire to weave energy efficiency into his organization because he sees energy efficiency as the conduit to healthier homes and a necessary reaction to the climate crisis. Reducing energy bills for his participants is a big plus, too. However, there have been some barriers to his participation.

Wyatt explained that Taking Ownership PDX is a small organization that doesn't yet have resources to dedicate to energy efficiency. He doesn't have an energy efficiency background so he's learning as he goes. He has learned that there are energy efficiency resources available from utility programs, but he doesn't feel like he knows how to navigate them. He explained that the resources aren't straightforward for him or other folks that aren't in the energy efficiency world. They don't necessarily know what to ask for or who to ask.

For example, a broad efficiency program with many different incentive offerings can be overwhelming. It feels like participation requires Wyatt and the homeowners to have a high level of energy efficiency literacy to just know what to ask for and where to get started. This is further complicated by multiple organizations offering overlapping services and having different criteria for participation. It can seem unattainable if it's their first foray into energy efficiency programs. That said, Wyatt emphasized that it's important to him to continue to make efforts to participate in energy efficiency programs.

The collaboration with Energy 350 worked for Wyatt because it was a tangible, straightforward service and we didn't require a whole lot from him. All he had to do was send out a mass email to homeowners, and we took the baton and worked directly with homeowners from there. We checked in at progress points and when we got stuck, but overall we didn't lean on him to make progress.

Lessons Learned

Energy 350 and C+C collaborated to derive lessons learned from this diversity-focused energy efficiency project under four main headers: outreach, trusted implementers, cost-

⁷ As of June 2022, Wyatt has assembled a robust list of 10+ contractors that he can assign to projects. He is making headway with this barrier.

effectiveness, and diverse contractors. In addition, C+C provides supporting examples from their communications and marketing perspective.

Lesson 1: Outreach

Reach out to trusted community members. Outreach should focus on engaging trusted community members within underserved groups, both in traditional and virtual spaces. Energy 350's partnership with Taking Ownership PDX allowed us to access Wyatt's large network of local Black homeowners. We were immediately plugged into a network of folks that were active and connected within the community. Many recipients offered to advertise our program within their Black-focused networks, which demonstrated their trust in Wyatt. We filled our program to capacity quickly and efficiently, with the door open to more participants should we expand.

Don't center energy efficiency. Outreach should center around comfort, reliability, or other benefits, not necessarily energy efficiency. Energy efficiency will be a byproduct of increased safety, comfort, or reliability. For this small diversity-focused project, Energy 350's goal was to strip out as many barriers as possible to see what it would take to provide access to energy efficiency upgrades to anyone in a historically underserved population. For example, participants in this project had no income requirements, no paperwork to fill out, and someone to hold your hand throughout the entire process. We believe this led to more participation.

Initially we decided that a requirement should be that the existing water heater is electric. If we replaced a natural gas water heater, utility cost savings would be less and installations would require electrical upgrades.

We abandoned the electric baseline requirement by the end of the project. Contrary to our assumptions, we discovered through exit interviews with participants that decreased utility cost is not the main driver for a homeowner to pursue a HPWH. The homes in our sample were older and had older appliances. A large driver for the homeowner was replacing an older appliance and avoiding the looming capital outlay when their existing water heater finally breaks. In two cases, the homes were operating with insufficiently heated water or no hot water at all. In three other cases, the homeowner described their water heater as "end of life" but working for now.

One HPWH recipient illustrated her motivation for participating in an email-based exit interview. She wrote, "On a personal note I cannot express how grateful I was and the timing of this program. As a single mom it took everything to just be able to buy a place and what I could afford came with the fact that all the appliances and equipment was all super old and at the end of its life. It feels like a bunch of ticking time bombs for what's going to give out first. It is nice to not worry about the hot water heater just quitting on me and be able to work on a plan for things like the furnace and AC that are equally as old."

For the three natural gas water heaters that we replaced, Taking Ownership PDX offered to cover the costs related to upgrading the electrical service to the water heater.⁸ In a follow-up conversation with Randal Wyatt of Taking Ownership PDX, he reiterated his commitment to providing electrical costs if we continued to provide the water heater and plumbing costs, emphasizing the benefit of providing a new, modern, and reliable appliance to his target population. While it is not necessarily a motivator, there are also decarbonization benefits of replacing natural gas water heaters with HPWHs.

⁸ A HPWH requires a 240V disconnect and a 110V plug if a condensate pump is required.

Lesson 2: Trusted Implementers

Trusted implementers should deliver programs. Ideally, program implementers should themselves be members of the target community. However, that may not be possible for all communities, and in those cases a trusted implementer must be selected. This person can be someone from the target community or someone who builds trust by being culturally aware of diverse cultures. It can also be someone whose trust was transferred by a trusted organization/entity in that community.

In the following sections, we delve into two HPWH installations to illustrate the need for trusted implementers. One example describes a success, and one example describes a failure.

Example of Implementation Success. When we asked for participant feedback, one participant said she was grateful to work with someone who was culturally sensitive related to the difference in generational wealth between Black Portlanders and white. She elaborated that she initially had some reservations revealing all the extra work that her home needed for this HPWH install. This homeowner has a home that was built in 1907. The installation required relocating a washing machine, clothes dryer, and furnace in an in-progress basement apartment. Relocating the water heater incurred additional plumbing costs. Since the space was to be occupied, the installation also required exhaust ducting. The homeowner installed a creative ducting solution, removing a window and rebuilding the wall around the duct. The total installation cost was \$4,754 (164% of the average cost), covered 100% by Energy 350 and Taking Ownership PDX. The homeowner covered additional costs due to removing an old furnace and relocating the washer/dryer.

The implementers at Energy 350 are not part of the target population but the trust earned from partnering with Taking Ownership PDX was transferred to us. We infer from the participant's feedback that she was initially hesitant to work with the Energy 350 implementers because of the risk that her needs would not fit into the program. She chose to participate because the initial invitation to participate came from Wyatt and Taking Ownership PDX, who she knows and trusts. In the end, we feel she recognized that we had her best interests in mind and was satisfied participating in the program. In an emailed exit interview, she wrote, "Thank you to Energy 350 for your support in installing our new energy efficient water heater. We were thrilled when Randal at Taking Ownership contacted us about the opportunity. We are very appreciative to Energy 350 for your support in installing our new energy efficient water heater. This eased our load on the big on going project of our home renovations and Lisa at Energy 350 was a pleasure to project manage this with."

Example of Implementation Failure. The home in question had a broken natural gas water heater. The installation of a HPWH required a licensed electrician to wire in a 240 V disconnect and 110 V plug at the site of the water heater. Taking Ownership PDX offered to fund the electrical upgrade costs, and both Taking Ownership PDX and Energy 350 sought out electricians to do the job.

The plumber installer offered to send out an electrician that they routinely partner with. However, the electrician that they sent out refused to do the job and we later discovered that the electrician took issue with the home occupant and the interaction was extremely negative. In a discussion with Wyatt, he suggested that in the future, contractors should be vetted first, not solely based on recommendations from other installers. Wyatt stepped in and found a Black electrician to do the install.

This example is presented as a failure that further reinforces the need for diverse implementers, overlapping with Lesson 4. In the end, the installation was a success because the house contact chose to remain in the program and finish the install. The homeowner received a new HPWH and its occupants received hot water for the first time since their existing water heater broke months earlier. We believe this is largely in part due to Wyatt intervening to mend and continue the relationship with the house contact. The bottom line is that having implementers who are trusted among the target population will increase access, and therefore increase energy savings for a program.

Lesson 3: Cost-Effectiveness

While cost-effectiveness may be the preferred method for programs to determine benefits, it may not be the best metric to use if programs want to increase access and energy savings.

As part of the 2021 Power Plan findings, the NW Power and Conservation Council indicated that the amount of cost-effective energy efficiency available over the next 20 years is less than previous years (NWPCC 2022). With less low-hanging fruit to harvest, we infer that if utility programs want to achieve future energy savings targets they will want to increase access to underserved communities.

Energy 350's HPWH project has a payback of 10.6 years using traditional cost effectiveness criteria. While this could stand on its own as a cost-effective project, we believe traditional cost effectiveness criteria misses a large opportunity to capture the unique benefits of energy efficiency in underserved communities.

We learned from our participants that the greatest value that they received from the HPWH program was related to health and safety and not energy. While most utility cost benefit tests seek to take into account non-energy impacts, it may be time to think about other metrics that reflect the need to include underserved communities. For example, providing a rebate for purchasing a HPWH excludes a large population that may not be able to make the capital expenditure required to receive the rebate. Cost effectiveness criteria commonly assigns most of the value to annual energy savings, while participants may place annual energy savings low on their list compared to other benefits. This disconnect is likely to present a barrier to access. If utility programs want to increase access to these communities, they will want to offer upgrades that are both free of program restrictions and upfront cost.

We question whether low-income programs are fulfilling this potential. For example, not all people who are part of underserved populations are low-income-qualifying. Low income is only one of many effects of energy and social injustice. Perhaps programs should center underserved populations rather than low-income. If they are income-qualifying, the burden of proving it is often placed upon the participant, making access more difficult than standard offerings.

While it may be difficult, health and safety benefits of energy efficiency can and are being quantified. The U.S. Environmental Protection Agency's State and Local Energy and Environment Program released a report that quantifies health benefits per kWh based on air quality health impact, and public health benefits from avoided emissions, aggregated into 14 regions in the U.S. (EPA 2021). For example, the benefits of uniform energy efficiency per kWh for the Northwest range from 1.06 cents per kWh to 2.39 cents per kWh saved based on a 3% discount rate. Note that these benefits are aggregate for the whole region; they under-represent the health benefits to folks that are living closest to power plants, highways, and industry where

air quality is significantly worse. We believe the next step would be to add a diversity component, teasing out a layer representing those who historically don't benefit from energy efficiency and renewables.

On a community and personal level, these benefits add up quickly, especially for populations that suffer from social and energy injustice. Significant health and safety benefits can be traced from each installation. Take for example the HPWH installation in the home that had a broken water heater. Occupants took showers at their local gym for months. This requires a gym membership, bus fare or gas money, and time that could be spent being productive elsewhere. These costs were eliminated with the installation of a new HPWH. In addition, imagine the psychological benefit from a sense of well-being and safety from having reliable access to hot water.

Another example relates to the three out of seven homeowners who described their existing water heater as end-of-life. There is a significant cost benefit from replacing equipment prior to failure. If you wait for failure, you lose the option of shopping for a good deal, getting multiple quotes on installation, or participating in incentive programs. You may end up paying for a last-minute or weekend contractor visit, or you may have to take a day or two off work to fix the issue. A known end-of-life replacement can provide peace of mind and potentially avert higher labor prices that may occur with unforeseen timing.

Further, those who suffer from energy injustice are the most energy burdened. They pay a higher percentage of their income on energy bills (Lewis, Hernández, and Geronimus 2019). An energy bill reduction of \$300 per year will have a higher value to an energy burdened individual than to someone where it represents a smaller percentage of their overall income. Traditional cost-effectiveness criteria hold every dollar equal.

Finally, as the energy industry begins to turn away from more fossil fuel use, the benefits of decarbonization should be included in cost-effectiveness criteria. On a fuel-neutral basis, replacing a natural gas water heater with a HPWH has a carbon reduction benefit that should be considered in cost-effectiveness criteria if it isn't already.

Lesson 4: Diverse Contractors

We learned that assembling a team of suppliers, plumbers, and electricians needed to start well before we reached out to water heater recipients. Once we had to decide between finding diverse contractors and providing good customer service to water heater recipients, we regretfully abandoned our search. Due to a shortage of diverse contractors, we owe it to them to spend the time and work it takes to find them and work with them. Our experience emphasizes the importance of diverse workforce development efforts in the energy transformation.

C+C Perspective on Reaching Diverse Communities

Energy 350 relied on Wyatt, a trusted member of the Black community in Portland, for outreach. We relied on his ongoing communications and marketing of Taking Ownership PDX to reach our desired audience. For the purposes of this paper, we wanted to present an outreach strategy that would be scalable for larger projects. We reached out to C+C, a communications and marketing agency we have worked with for large-scale utility energy efficiency programs in the Pacific NW region. C+C specializes in marketing campaigns reaching diverse communities. Many of the lessons learned from this small diversity-focused project aligned with C+C's

communications and marketing principles, and can be scaled to utility-sized diversity-focused projects. The following examples are provided from the perspective of C+C.

C+C Perspective on Outreach. Building and communicating trust is key when engaging with underserved audiences. At C+C, we've learned that trust is essential to minimize the barriers faced by these communities, regardless of the industry.

For example, in our work for a public transit agency to increase awareness of a service change, we partnered with community-based organizations to engage with audiences facing financial and language barriers. We were able to engage with low-income Spanish-, and Chinese-speakers because of the trust the organizations had built with the community. Because of this partnership we were able to educate residents about service changes and provided more than 9,000 transit passes with a \$20 credit to encourage them to continue using the different transit options. We feel a similar effort is required for utility energy efficiency implementation programs if they wish to increase their service to more diverse groups.

It is widely known that many energy-efficient products and programs have benefits beyond cost savings, especially in underserved communities. At C+C, we were thankful to have the opportunity to work on a campaign for Energy Trust of Oregon focused on increasing awareness of their energy efficiency products and services. Before defining the creative concept, we leveraged our market intelligence tool called "The Community" to test different creative themes and messages with the target audience including Spanish-dominant Hispanic/Latino audiences. Like Energy 350's HPWH project, we learned that saving money was not perceived as the main benefit of these services/products. Rather, it was the hope for a brighter/better future for next generations. Therefore, we focused on the "brighter/better future for next generations" even for Spanish dominant Hispanic/Latino audiences that tend to have lower incomes.

C+C Perspective on Trusted Implementers. C+C took a trusted implementer approach when partnering with Puget Sound Energy (PSE) to perform Small Business Direct Install services for multicultural businesses in areas with a high diversity index in South King County. Bridging the gap between PSE and multicultural business owners was key to performing these services successfully; therefore, the strategy consisted of working with a trusted source to help identify and engage with 50 multicultural businesses in the desired project region. This work required us to be flexible when creating the project structure to meet the needs of the non-profit community organization with which we partnered. When engaging business owners with language barriers, the organization would include bi-lingual, bicultural staffers at the time of engagement to mitigate the barrier. The project successfully scheduled 40 assessments during a three-month period and helped PSE to bring these services to businesses they had yet to engage with.

Concluding the Energy 350 HPWH Project

While this project was beneficial to us on a personal level, we concluded from our lessons learned that Energy 350 is not the right implementer for this project. We discovered two local community-based organizations doing similar projects on a larger scale, likely with lower project management costs, and with greater and more connected outreach than us. We intend to maintain our relationship with Taking Ownership PDX should they want connections into the energy efficiency industry in the future. We'd like to provide the upfront support they need to weave energy efficiency into their mission.

Utility Perspective

An energy transformation is coming as the nation pushes for reducing fossil fuels. As the nation decarbonizes, the utility landscape will have to change. Energy 350 has limited experience with small diversity-focused projects, but we have extensive experience working alongside utilities in energy efficiency efforts. We are not here to provide answers or a path forward for utility representatives and policy makers as we embark on an energy transformation of existential importance. However, this project experience has inspired us to try to leave the audience with a sense of why equity and energy justice should be regarded with the utmost priority.

In her book “Revolutionary Power: An Activist’s Guide to the Energy Transition,” Baker (2021) lays out a thorough and compelling argument for the why and how utilities can usher in an equitable future. She argues that if the same thinking that created the current utility landscape is used in this energy transformation, then the new utility landscape will be just as unsustainable. The notion that urgent climate action cannot afford to compromise on issues of justice and equity is fallacious. She reasons, “Buying into a discourse that centers the primacy of action over the primacy of people is inherently unsustainable and will inevitably lead to even greater instability than climate change portends (Baker 2021).”

One question we pose is: How do energy efficiency programs reach deeper into the building stock to reduce generation, decarbonize, and reach climate goals? We believe programs focused on serving the traditionally underserved populations provide a compelling option.

Charity Fain, Executive Director of Community Energy Project (CEP), a Portland-based community non-profit that provides free home services focused on safety, health, and energy efficiency, shared her ideas in a *Run Up the Numberz* audio podcast episode. She concludes that to make real progress toward climate goals, we need to focus on increasing accessibility of services. To be accessible, services must be free. There should be no income qualifiers. At CEP, they strive to provide their programs for free, regardless of income. If they must have income requirements due to certain funding sources, they don’t require forms proving income, which they see as access discrimination and an unnecessary barrier. They simply require participants to sign a form attesting that they qualify. Barriers should be up to program implementers to solve, not for the consumer to solve (Jones and Ambush 2021).

Can programs be innovative in stripping away barriers? Can programs be free for all underserved populations regardless of income? Can programs provide the most resources to the populations that need it most? Can programs be innovative in how they quantify and weigh the societal benefits of expanding access to underserved populations?

References

- Baker, Shalanda H. 2021. *Revolutionary Power: An Activist’s Guide to the Energy Transition*. Washington, DC: Island Press.
- EPA (U.S. Environmental Protection Agency) State and Local Energy and Environment Program. 2021. *Public Health Benefits per kWh of Energy Efficiency and Renewable Energy in the United States: A Technical Report*. Washington, DC: EPA.
www.epa.gov/sites/default/files/2021-05/documents/bpk_report_second_edition.pdf.
- Jones, K., and DJ Ambush (Hosts). 2021. “S2 Ep2: Run up the Numberz x Community Energy Project (audio podcast episode).” Podcast. *Run Up the Numberz*.

www.xraypod.com/show/run-up-the-numberz/2-run-up-the-numberz-x-community-energy-project-ep-2.

LDF (Legal Defense Fund). 2022. “Critical Race Theory: Frequently Asked Questions.” Washington, DC: NAACP Legal Defense and Educational Fund, Inc. www.naacpldf.org/critical-race-theory-faq/.

Lewis, J., D. Hernández, and A.T. Geronimus. 2019. “Energy efficiency as energy justice: addressing racial inequities through investments in people and places.” *Energy Efficiency* 13: 419–432. link.springer.com/article/10.1007/s12053-019-09820-z.

NWPCC (Northwest Power and Conservation Council). 2022. *The 2021 NW Power Plan*. Portland, OR: NWPCC. www.nwcouncil.org/media/filer_public/4b/68/4b681860-f663-4728-987e-7f02cd09ef9c/2021powerplan_2022-3.pdf.

Portland City Auditor. 2021. *City’s reliance on complaints for property maintenance enforcement disproportionately affects diverse and gentrifying neighborhoods*. Portland, OR: Portland.gov. www.portland.gov/ombudsman/news/2021/11/3/citys-reliance-complaints-property-maintenance-enforcement.