

**Pono Home – Hawaii Energy
Energy Efficiency Pilot Program**

March – May 2016

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Executive Summary

This report has been prepared by Pono Home, an energy efficiency company based in Honolulu, Hawaii. The purpose of this report is to give an overview of a pilot home efficiency service conducted in partnership with Hawaii Energy, Energy Excelsior, and Kanu Hawaii from March to May 2016. The program primarily targeted low-income, single family homes. We are unaware of any other program of this type and scope and therefore present our findings, suggestions, and best practices for other such programs to come. In this groundbreaking program, Hawaii Energy provided funding for Pono Home to do direct installs of efficiency measures such as LED lamps, high-efficiency shower heads and faucet aerators, and advanced power strips in Hawaii residents' homes. There were no qualification requirements for residents except that they pay an electric bill with the local utility and that they sign to authorize the service and agree to have their utility consumption aggregated and monitored. Hawaii Energy allowed for the direct replacement of inefficient fixtures (such as incandescent bulbs or low efficiency water fixtures) and the installation of advanced power strips. The pilot took place between March 1, 2016 and May 31, 2016. Among others, the goals of this program included increasing statewide energy efficiency, educating residents about energy and water efficiency, assisting low-income residents, and reaching populations that have previously been difficult to reach with energy efficiency programs.

We installed a total of 12,252 total products, including 10,175 light bulbs, 1,695 water conservation fixtures, and 382 advanced power strips in a total of 579 homes. We estimate that a total of 1,786 people were served through this program. We serviced homes in 36 different zip codes on Oahu and Maui, and 34 of the residences we serviced were self-reportedly Section 8. From the measures installed in this program, we expect to see a state-wide energy reduction of 485,548 kWh/Yr across 579 households. Using the local utilities' effective rates for the relevant months, the monetary savings would be \$167,514.06 or an average of about \$289 per year per home on electricity alone. In addition, water and gas savings are expected to amount to substantially more.

In order to evaluate the effectiveness of the educational aspects of the program, we distributed an online survey to program participants after the pilot program ended. We received 129 survey responses, or 22% of the total program participants. Survey participants responded to questions about their knowledge before and after the service, evaluating the educational value of the service. They also responded to questions about their overall satisfaction with each type of product. Comment boxes were provided to collect qualitative data from the survey as well. Survey data are included in the report along with analyses. Overall, the survey showed that the service was very educational to residents, that people were highly satisfied with the products installed and the service performed.

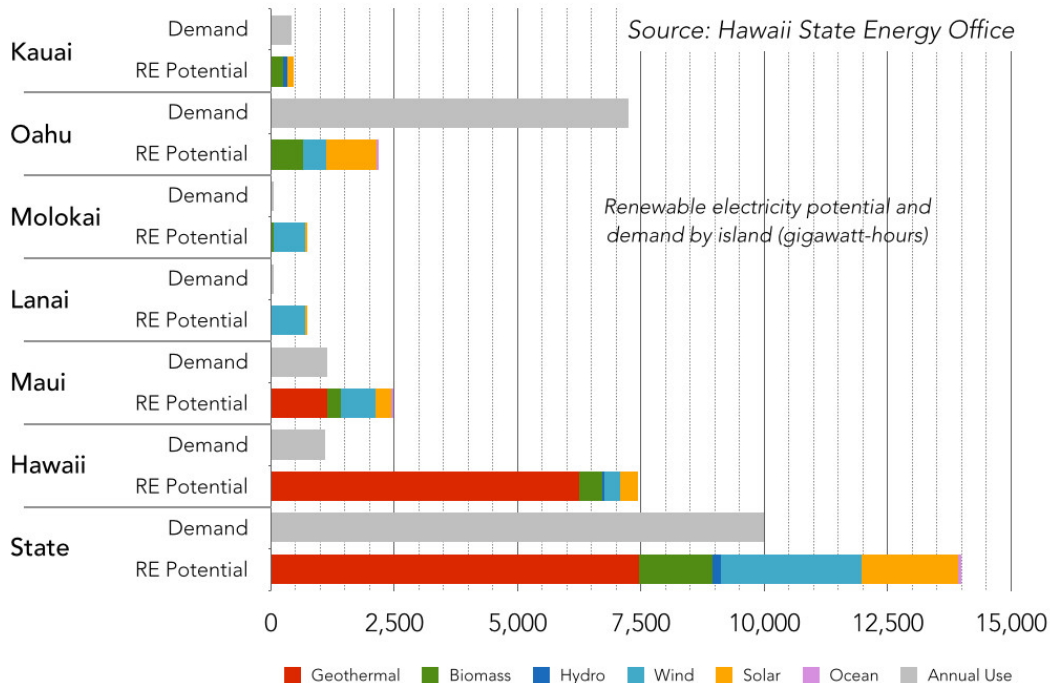
The final section of this report contains valuable insights and lessons learned during the pilot program. This includes the challenges we faced, strategies we used to overcome those challenges, and things we learned to improve future programs. This section also includes examples, anecdotes, and case studies from our technicians and testimonials from residents who received the service.

Program Overview

Background and Need: Energy Efficiency in Hawaii

Energy efficiency is crucially important for the Hawaiian Islands. In 2013 Hawaii imported about 91% of its energy and in 2014 it had the highest electricity prices in the nation.¹ In light of Hawaii's relatively remote location, sensitive ecosystem, and high energy prices, the state has set an ambitious and unprecedented goal to provide "100 percent renewable energy in the electricity sector by 2045." Governor David Ige signed this goal into law in June 2015 (HB 623). The state's report also quotes that "The most direct way to get all of the state's energy from renewable sources is to use less energy."² An energy reduction goal was set at 4300 gigawatt-hours by 2030, or a 30% reduction. Efficiency is more than just the "low-hanging fruit," in the clean energy goals, however. A report by the Institute for Local Self-Reliance in 2015 demonstrates that efficiency is necessary to achieve this ambitious goal. A graph from this report (pictured below) shows the renewable potential for each island and the entire state compared with current demand. The promising finding is that the state of Hawaii has potential to more than supply its electricity needs with renewable sources. Oahu, however, is the only island where renewable energy potential is considerably outstripped by demand. It is crucial that Oahu decrease its energy usage in order to meet the 2045 goal. (Grimley and Farrell, October 2015)

RENEWABLE ENERGY POTENTIAL

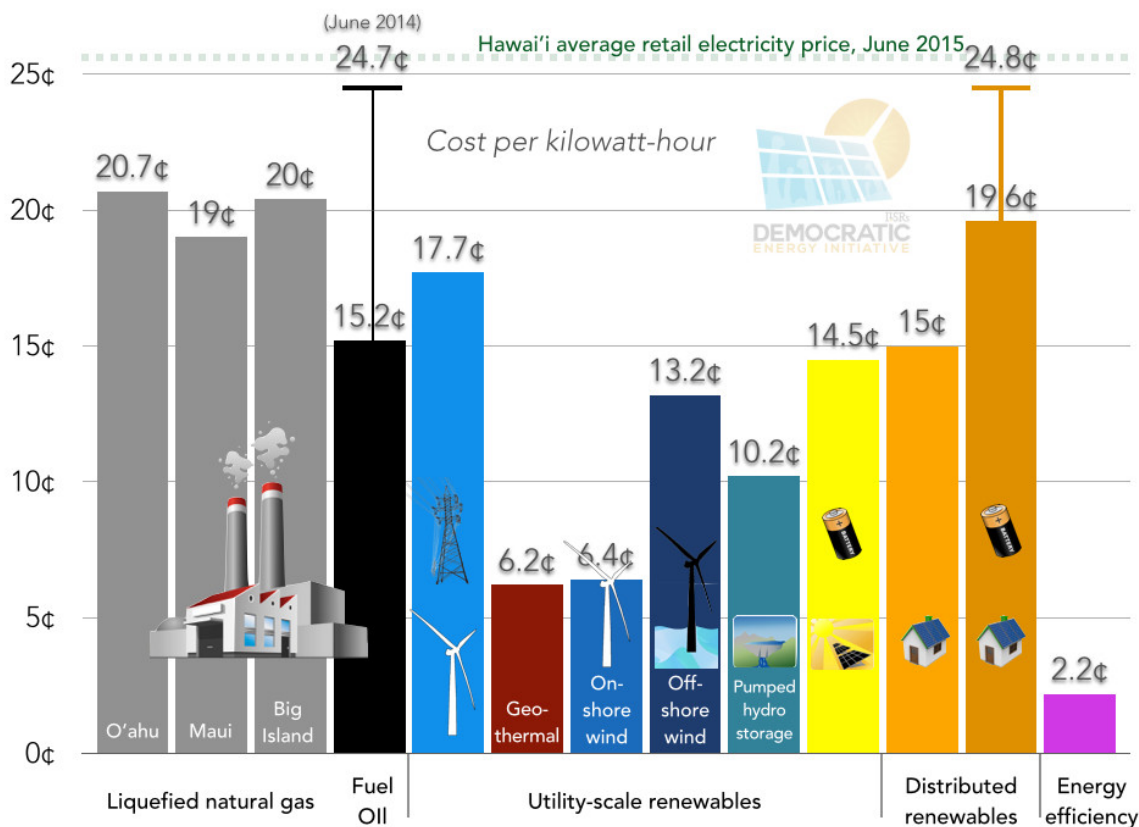


¹ U.S. Energy Information Administration, sourced from <http://www.eia.gov/state/?sid=HI>

² State of Hawaii Energy Resources Coordinator's Annual Report 2015, pg. 3, sourced from http://energy.hawaii.gov/wp-content/uploads/2014/12/DBEDT_2015ERC-Report_Nov2015.pdf

Another graph from the Institute of Local Self Reliance's report shows that energy efficiency is by far the most economically viable source for future energy needs in Hawaii.³

COST OF HAWAI'IAN ENERGY SOURCES



This program, sponsored by Hawaii Energy and executed by Pono Home, sought to reach residential customers who would not otherwise adopt efficiency measures because of barriers like language, price, inconvenience, and lack of knowledge.

Program Partners

This program represented a partnership of several organizations with similar goals. Pono Home, the company that did the installation work, is a Honolulu based company founded to do energy and water efficiency in the residential and small business sectors. Hawaii Energy funded the program. Hawaii Energy is a ratepayer-funded conservation and efficiency organization serving Hawaii, Honolulu and Maui counties administered by Leidos Engineering, LLC under contract with the Hawaii Public Utilities Commission. Energy Excelerator is the nation's largest clean tech accelerator of which Pono Home is a cohort member **on the 2016 Demonstration Track**. Kanu Hawaii, who helped publicize the service, is a 501(c)3 nonprofit based in Honolulu

³ Grimley and Farrell, October 2015, pg. 1. Sourced from <https://ilsr.org/wp-content/uploads/2015/10/Hawaii-at-the-Energy-Crossroads-ILSR-2015.pdf>

that empowers social change using island-style activism and personal commitments to build a better future for Hawaii.

These organizations have a common objective to increase energy efficiency, and collaborated on creating this pilot program to reach Hawaii residents with a message and tangible measures. In this program, Pono Home was given limited-time funding to do direct installs of LED lamps, high-efficiency water fixtures, and advanced power strips in Hawaii residents' homes. Technicians also educated residents about ways they could further save on their utilities. The only requirements for residents were that they hold an account with the local electric utility and that they provide a signature to authorize the service. "Pono Home's pilot is one of the many ways that Hawaii Energy is able to expand our conservation and efficiency efforts to hard-to-reach residents," said Caroline Carl, Hawaii Energy Deputy Program Manager of Operations. "Although electricity rates have fallen recently, the long-term reduction of energy use and electric bills can enhance quality of life for many local families."

Measures

Primary measures installed were light emitting diode (LED) lamps, high efficiency showerheads and faucet fixtures, and advanced power strips (APS). Hawaii Energy required that all bulbs be Energy Star® certified. CFL bulbs were also approved measures for the program, but Pono Home primarily installed LEDs because of their superior efficiency, preferable light spectrum, and lack of mercury.

The following is a complete list of measures installed:

- A19 40wEq LED
- A19 60wEq LED
- A19 100wEq LED
- PAR16 LED
- BR40 LED
- BR30 LED
- R20 LED
- PAR30 LED
- PAR38 LED
- G25 LED
- MR16 LED
- B11 LED
- A19 60wEq CFL
- A19 100wEq CFL
- R20 CFL
- BR40 CFL
- BR30 CFL
- G25 CFL
- PAR38 CFL
- 1.5 GPM shower head, standard
- 1.5 GPM ADA shower head (handheld)
- 0.5 GPM faucet aerators of various sizes and flow types
- 7 outlet Advanced Power Strip

Limitations

Several types of limitations applied to this pilot program. First, there were some limitations mandated by Hawaii Energy. One such limitation was that LED light bulbs could only be installed on a one-for-one basis to replace working, inefficient bulbs. LEDs could not be installed to replace missing or burned out bulbs, or relatively efficient bulbs (e.g., CFLs). Another limitation was that Hawaii Energy cannot incentivize hot water savings if the water

heater uses gas as a heating fuel. Handheld, or ADA, showerheads could also not be installed in place of a fixed showerhead, for budgetary constraints. The work was also limited to just three months, from March 1 to May 31, 2016. During the service, Pono Home technicians were required to collect information about the type of home (single or multi-family), water heater type, number of occupants, HECO contract ID number, and contact information.

Goals

Ultimately, the shared goal of this program was to reduce overall electricity demand and expand statewide energy efficiency in Hawaii. This was broken down into obvious goals of saving electricity and water by installing high-efficiency upgrades in residents' homes, educating residential customers about energy efficiency, and expanding energy efficiency capacity across the state. By contracting a locally owned business focusing on residential, single family energy efficiency services, it helped produce lasting economic gains for the state, allowed the company to hire and train multiple technicians on energy efficiency programs, and provided funding that helped amplify some funding provided by the Energy Excelsior.

Hawaii Energy also stated the goals of reaching "hard to reach" groups of people. Traditionally, this has included renters, low-income residents, non-English speakers, and anyone else who hasn't previously participated in their programs. Outreach for the program was therefore targeted toward these groups and all of Pono Home's marketing materials were translated into 9 languages to facilitate work.

Program Accomplishments

Installations, Impacts, and Expected Program Savings

In three months we installed a total of 12,252 total products. This included 10,175 lamps, 1,695 water conservation fixtures, and 382 APS in a total of 579 homes. Due to the cost of living and cultural reasons, Hawaii is known for having multi-generation homes with many residents. From the data we collected on household occupancy, we estimate that 1,786 people were served through this program.⁴ Energy saved amounted to 485,548 kWh/Yr across 579 households, yielding estimated financial savings of \$167,514.06 (an average of about \$289 per year per home on electricity alone). Water and gas savings were not calculated scientifically for this report, as suggested by Hawaii Energy due to a large number of confounding variables. However, about 800 showerheads were changed from 2.5 gallon per minute (GPM) to 1.5, which can yield 10 gallons of heated water saved per shower. Given roughly 1800 people were served by this program, and assuming 75% of those people received a showerhead upgrade and that they each shower once per day for 10 minutes, this should yield savings of about 5,000,000 gallons of heated water annually. About 900 faucets were upgraded from 2.2 GPM to 0.5 GPM. Estimates of faucet water use vary so widely as to make any analysis unreliable, so no estimate is made.

⁴ The data used to estimate the size of households for those we did not have data for came from the Department of Business, Economic Development and Tourism's 2014 Data Book. (State of Hawaii Data Book, 2014).

Demographics Served

In the interest of prioritizing the hard-to-reach demographic, residents desiring a service were directed to a short online survey where they entered their contact information and had the option of answering a few questions. The demographic information we collected from this survey included whether the resident was a renter or homeowner, their household income, number of residents in the home, whether or not they were Section 8, and their town and zip code. Of the 579 homes serviced, 299 were renters and 280 were homeowners. 34 homes were self-reportedly Section 8, a government-funded program designed to help low-income renters by paying rental housing assistance to private landlords. It is very possible that more homes could have been Section 8 and residents did not report themselves as such.

We also gave the option of reporting household income level. Out of 579 households served, we collected income data for 320. Below is a breakdown of income levels from our survey responses:

- \$150K+ = 39 households 12.2%
- \$100-\$150K=57 households 17.8%
- \$75-\$100K =52 households 16.3%
- \$50-\$75K = 75 households 23.4%
- < \$50K=97 households 30.3%

According to standards set by the Hawaii Community Development Authority and federal Housing and Urban Development Department, 111 of these 320 residents who filled out income information on the survey fall into the “low income” category.⁵

Geographic Reach

With several technicians working on Oahu and one on Maui, the maps below represent a compilation of all the addresses serviced in the three-month pilot program:

⁵ Here we refer to “low income” as defined in the March 2015 Hawaii Community Development Authority report, sourced from <http://dbedt.hawaii.gov/hcda/files/2014/10/POTS-Report-022415.pdf>

- Wahiawa 96786 - 1
- Mililani 96789 - 8
- Kula 96790 - 16
- Waialua 96791 - 1
- Waianae 96792 - 33
- Wailuku 96793 - 13
- Waimanalo 96795 - 9
- Waipahu 96797 - 9
- Hawaii Kai 96812 - 1
- Honolulu 96813 - 11
- Honolulu 96814 - 18
- Honolulu 96815 - 25
- Honolulu 96816 - 59
- Honolulu 96817 - 24
- Honolulu 96818 - 2
- Honolulu 96819 - 9
- Honolulu 96821 - 6
- Honolulu 96822 - 19
- Honolulu 96825 - 10
- Honolulu 96826 - 39
- Honolulu 96701 - 1

Post-Program Survey Research

Survey Methodology

To evaluate the effectiveness of the program, we distributed a survey to program participants once the program had ended. The main goal of the survey was to collect quantitative data about how the residents liked the high-efficiency upgrades after living with them for a few weeks or months and whether or not they had learned about energy efficiency during the service. A secondary goal was to collect qualitative data in the form of quotes, comments, suggestions or testimonials. We chose a survey to collect both types of data because of the convenience, uniformity, and ease of access that an online survey provides.

The survey was distributed to program participants via email and via phone interview. In order to incentivize maximum participation, fifteen prizes were offered to survey participants who were willing to record their name and contact information on the survey.

Results

129 people out of 579, or roughly 22% of people who received services, responded to the survey. Results and graphics for each question applicable to this report have been recorded in Appendix C.

Survey Research – Analysis

The findings of the survey generally show that respondents reported an increased level of knowledge about energy efficiency, LED lights, high-efficiency water fixtures, and APS. They also reported learning about other energy efficiency issues. Program participants reported an extremely high level of satisfaction with the products installed.

Educational Results

The first five questions, as well as questions 8 and 9, dealt with different aspects of education the residents received during the service. Questions 1-4 deal with the resident's knowledge level of energy efficiency, household lighting, water efficiency, and APS before and after the service. Questions 1-3 have remarkably similar results. In all three questions, which asked about one's knowledge of general energy efficiency, household lighting, and water efficiency, 20-22.5% of people responded that they had very little or fairly low knowledge of these issues before the Pono Home service. 41-43% reported that their understanding was fairly high or very high before the service. After the service on all three questions, only 1-1.5% reported their knowledge in the lowest 2 categories and 87.5-90% reported their knowledge in the highest 2 categories. Average gross score went from 3.23 to 4.42, an improvement of 1.19 (23.8%).

Question 4, regarding APS, showed that 53.5% of people reported their understanding of this technology in the lower 2 categories before the service, with 16% in the higher 2 categories. After the service, 9% remained in the lower 2 with 68% reporting a fairly high or very high understanding. About 10% answered not applicable. While not as many people reported a fairly high or very high understanding of APS, overall learning improved from 2.3 to 4.0, an increase of 1.7 or 34%. Learning on the APS was higher than on other efficiency measures. These numbers could differ from the first three questions for several reasons. One is that this technology is not as widely known as LEDs and water efficiency measures. For many, this was their first exposure to the concept of a product that reduces vampire loads. Another reason, which would also explain the higher percentage of those who answered N/A, is that technicians evaluated the entertainment center setup in each home and sometimes decided that an APS was not needed and therefore one was not installed. Technicians may also have skipped this part of the service if someone in the household was not available to receive education on the power strip. Of the people who had a power strip installed, the grand majority replied that they would be able to set it up correctly if they ever had to move it: only 6% felt like they would be unable to install an APS on their own after they received education from a Pono Home technician.

Questions 8 and 9 also dealt with education. Both questions provided a list of education points customers may have learned during the service. Question 8 asked which ones they learned, and question 9 asked which one was most important. On both questions, the leading response was "saving water often means saving energy, too." This suggests that residents are generally not as well-informed about the water-energy nexus as about other aspects of efficiency. It seems this was an important and valuable aspect of the service.

Customer Satisfaction

Question 6 dealt with customer satisfaction regarding 5 different products, including LED lights, high efficiency faucet aerators, high efficiency handheld and standard shower heads, and APS. Customer satisfaction is extremely important to the long term success of the program - not just to give the program a favorable rating in the eyes of the public, but also to ensure that residents do not remove efficiency measures and replace them with inefficient products after the service. This, obviously, would be detrimental to the longevity of the program's effects. Because Pono Home was developed as a private sector program targeting single-family housing, the company has always been very intentional about selecting high-quality products with great customer reviews. This is a different approach than many traditional utility-scale efficiency projects take, many of which are simply focused on function and not on the end user experience.

The data have been adjusted to only reflect the answers of those who received each item. Of those who received them, residents seem to be most enthusiastic about the LED light bulbs, with 97% giving them a neutral rating or above and 83.9% giving it the highest rating in our survey. Faucet aerators received the lowest satisfaction rating of the products, but still received a 91.6% satisfaction rating. Perhaps most surprisingly, 98.7% of people who received a high efficiency showerhead were satisfied, with 66.7% giving it the highest satisfaction rating. 96.4% of people were satisfied with their APS, with 77.1% giving it the highest satisfaction rating.

Insights

Surprising Findings

Amount of Incandescent Lights. One of the more surprising things we found through this program was the sheer quantity of incandescent lights still in use in people's homes. As previously stated, we installed a total of 10,175 high efficiency lights in 579 homes. All these bulbs directly replaced incandescent bulbs. That represents an average of 17.6 bulbs per home, although the actual number of bulbs in each home varied greatly depending on location, size of the home, and other factors. Given that only about 5% of survey respondents said they had little or no knowledge of how their household lighting affected their energy bill before our program, and given Hawaii's very high energy costs, we had not anticipated seeing so many incandescents.

Some barriers we discovered through our conversations with residents were the harder to reach fixtures, an incomplete self-audit, lack of knowledge about the significance of potential financial savings of LEDs, a perception that high-efficiency lighting was somehow lower quality (perhaps a misperception perpetuated by people's dislike of CFLs), the cost of LED lights in the store, and the potential of negative health effects from electromagnetic frequencies (EMF) put out by LEDs and CFLs. Some of these barriers will be discussed in the following sections. Testimonials from our survey and other venues showed that residents were also surprised to find so many incandescent lights:

"Amazing service. I thought we had changed all our lights to CFLs, but he found 23 more incandescent bulbs." –Anonymous (survey)

"C.J. from Pono Home changed 86 bulbs inside and out. Very professional. Great service." -Richard M. (Yelp)

"Great service! Changed 51 light bulbs, inside and out, plus shower heads, sink faucets, and power strips. CJ was the bomb!!" - Kelly B. (Yelp)





Outreach and Qualification Challenges

One of the challenges we faced was outreach. Pono Home is a small company, and had limited time to market the program and reach out to the community. The nature of the free program also led to skepticism. Below are some of the successes and challenges we faced concerning outreach and marketing the program:

Marketing to the Masses in a Limited Timeframe. We knew from the outset that reaching people with the service would be one of the most difficult parts. Therefore, we used a multi-tiered marketing approach including the following strategies:

- Door-to-door - Pono Home technicians canvassed no fewer than 40 neighborhoods with significant numbers of lower-income residents.
- Expos - Pono Home had a representative at the Hawaii Buildings, Facilities & Property Management Expo in March, along with several smaller events during the program.
- Press - Pono Home was featured in a story in the Honolulu Star-Advertiser on March 24.
- Advertisements - 1/6 page ad in GREEN magazine for the April - June issue, and ads on Craigslist during the program.
- Email - Hawaii Wellness Magazine (paid) and Blue Planet Foundation (free) both sent out information about the service to their email list.
- Printed Material - Flyers were posted around Oahu and Maui by Pono Home staff and business cards handed out door-to-door the first several weeks of the program.
- Letters - 2,200 Section 8 residents received information about the service in the mail in March.
- Social Media - The service was featured in local sustainability nonprofit partners' social media pages, including Kanu Hawaii (FB), Blue Planet Foundation (FB), Surfrider Foundation (FB), and Sustainable Coastlines Hawaii (IG). Pono Home

staff also posted it on related social media sites, including Hawaii Pacific University Global Leadership and Sustainable Development, Vegfest Oahu, Transition Oahu, and Hawaii Pacific University Leaders for a Sustainable Future.

Despite our best efforts, one piece of feedback we heard all too frequently was that people wished they had known sooner, or they wished that we had marketed the service more aggressively. Although they had heard about the service and received the benefit, they seemed concerned that so few people would be able to reap the benefits of this limited-time service. Here are some quotes from the survey:

“I had been referred to this service by a friend. My only regret is that because the project was ending at the end of May, I didn't have time to recommend participation in it to friends and neighbors. I hope it will be continued! If it is, please let me know so that I can recommend friends to your website for consideration.”

“I've told my family and friends about it, and I hope they followed up on it. I hope this program continues so more people in Hawaii can take advantage and do their part. I would suggest reaching out to electricians, contractors, etc. to tell their clients about this program. I talked to my contractor friend and they had no idea about this program. It'd be even more convenient if you can get this installed while renovations are going on, and having efficiency from the get go.”

“Tristan was very courteous, professional, and very helpful. Will you be offering this service again in the future?”

“Communicate the service better. We heard via FB from Anthony.”

“Loved the service. Was very professional, informative and helped me understand how every little bit helps. I think not everyone knows about this service - and to help gain a wider reach for energy efficiency, to inform more people about this service use Facebook Ads/events, targeting young professionals that already care about the environment and help them to become more energy efficient. In addition, energy ambassadors would be another way to help spread the word - using small videos and making them "viral" to create more interest and engagement.”

“I think this is a great service that everyone needs to know about. Sarah was very informative, friendly and efficient at her job. I hope this free program continues so I can tell more friends and family.”

“Tristan was terrific. Get the program going again so my friends can take advantage of it.”

“I love the service! Wish there was a 'part 2' for even more savings...”

Reaching the Low-Income Communities. We wanted to get the benefits of this program to where they were needed most - into low-income communities. Perhaps the most successful ways of reaching out to low-income communities were by using the Kanu Facebook page and Section 8 mailer to reach residents in publications already familiar to them.

Kanu Hawaii Facebook Text:

Below is the text used by Kanu Hawaii on Facebook to inform followers about the service:

“Like save CHOKE energy? Pono Home is offering a limited number of 100% free home efficiency services to help ohana in Hawaii save money on utility bills. Get a house full of LED lights and other high-efficiency fixtures for free. Short sign up form here: <http://ponohome.com/free-home-efficiency-service/>”

Section 8 Letter:

Below is the text sent out to Section 8 residents in their monthly mailing:

Aloha Tenants and Landlords,

We are writing this letter to inform you of a limited-time program you are eligible to participate in. Local home efficiency company Pono Home is now offering **100% free** home efficiency services to our residents to help you save money on your utility bills.

The free program includes the following free hardware installations: (at resident request):

- LED lighting
- High-efficiency plumbing fixtures (showerheads and faucet aerators)
- Advanced power strips

To get started, please fill out this survey: <http://ponohome.com/free-home-efficiency-service/>. All results will be kept confidential. Funds for this program are limited, so if you would like to participate, fill out the survey as soon as you can, and Pono Home will contact you to schedule your free service.

If you have any questions about the survey or the service, please call Pono Home at (844) GO-PONO-1 Ext. 1 or e-mail info@ponohome.com. Funding for this program is made possible by partners Hawaii Energy, Energy Excelsior, and Kanu Hawaii.

We also went door-to-door in low-income neighborhoods offering the free service. This saw very poor results. While some were happy to receive the free service, many were skeptical and did not allow technicians into their homes for the service. Overall, we found this method of outreach was met with low trust.

Altogether we serviced 34 homes where the residents were self-reported Section 8 tenants. However, we had no other way of knowing whether or not they were Section 8 except by asking them, so people could have given us incorrect information for various reasons. Our online sign-up gave the option for people to fill in an income bracket, and approximately 30% of all the homes serviced fell in the \$50k per year or less category.

Multi-Family Buildings. Multi-family unit buildings are often viewed as an easy way to service many low-income units at one time and are often targeted by conservation programs for their higher rate of efficacy than single-family homes. In this program, this type of work posed its own outreach challenges. Property managers (especially of low income/Section 8 buildings

with many units) tend to need a little lead time to get approvals for programs like this, and given the exceptionally limited timeframe of this program, this proved to be a significant barrier. In addition, the “low-hanging fruit” had already been picked in several of these properties. We visited several properties in which the common (A19) incandescent bulbs had already been replaced with CFLs, advanced power strips had been given to residents or property managers, and water saving fixtures had been installed already, except in properties where the water was heated with gas. Given the scope of this project, there was little to offer these properties. Compounding this challenge, many property managers and office managers also were not fully aware of previous efficiency work that had been done on site. Several wanted to do LED lighting upgrades and consistently reported that their residents did not like the CFLs, so there was unfortunately nothing we could do for them.

Success in Referrals. Perhaps our greatest success in outreach was harnessing the power of Hawaii’s strong social ties. Once we had “gotten a foot in the door” so to speak, convincing a resident that this program was genuinely a free, ratepayer-funded, limited-time event and they saw the quality of upgrades they received at no cost, people were eager to refer their friends, family, coworkers, and neighbors. One technician calculated that at a minimum, 70% of her services came directly from referrals. This point is driven home by the fact that our technicians serviced approximately 130 homes in March, 150 in April, and 300 in May. This isn’t because we did more marketing or door knocking in May - on the contrary, we did no door knocking in May. The increase in demand can be explained by the program gaining momentum through referrals. In future programs of this type, efficiency contractors can better harness this “free” marketing by asking for referrals, reminding people to tell their friends and family about the service, incentivizing referrals, and asking people to spread the word on their social media networks.

Utility Programs – Operational Challenges and Strategies

Lack of Standard Fixtures. Residential installations tend to be less standard (in terms of the fixtures encountered) than commercial. In addition, single family programs will have a much more diverse fulfillment than more standardized multi-family buildings. While some bulbs are more common than others, there is really no “standard” fixtures in homes. We carried the most common bulbs, but still sometimes saw bulbs that had a size, shape, or wattage we could not match with our inventory. For instance, we saw a wide variety of each type of bulb: B11s in 25, 40, and 60 watt variations and different shapes and colors. Similarly, we saw A19 bulbs in 40, 60, 100, 3-way, 150, 200 and even 250 watts. We found 2200K, 2700K, 3000K, and 5000K light spectrums. We did the best we could with what we had at the time, trying to match bulb sizes, shapes, and wattage as closely as possible.

Broken Fixtures. Another operational challenge we faced could be seen anywhere, but was probably exacerbated by the Hawaiian climate. Many fixtures were old, corroded, brittle, stuck, or otherwise in a state of disrepair. Despite our training and care in handling, broken fixtures are part of the equation when upgrading older homes. Among other things, we saw faucets, ceiling fans, outdoor bulbs and light covers damaged during the attempt to upgrade them. As the program progressed, we attempted to learn from each other’s mistakes and watch for high-risk fixtures. For example, older MR16 bulb ceramic base fixtures tend to crack easily.

We also learned to be very gentle with ocean-facing outside lighting because the bases would often corrode and become stuck in the fixtures, causing the bulb to twist free and the base to be left behind. We also experienced corroded faucet fixtures bending as a result of too much force and light covers cracking, sometimes from very little force or pressure.



Inventory. Inventory management in general was difficult, due to the the scale of the project and the limited time frame. From the outset we were attempting to buy as many LEDs as possible at the lowest price possible while still buying Energy Star certified bulbs. This often meant ordering from the mainland and waiting weeks for large shipments, while technicians went on with the work as best they could. It was helpful to be able to substitute CFLs for the most common bulbs, but our team ended up passing over many of the less common (e.g., B11s, MR16s, PAR16s and PAR38s) that could have been changed if we had had the inventory on hand. It is worth noting that CFLs were a tiny minority of what was installed, as people generally do not like them for their performance and appearance, and much prefer LEDs, a finding that we encountered frequently throughout the program, and which is reinforced in our post-service surveys.

This brought up another issue, which was whether or not (and how) to process a return to a home we had already visited when we were able to restock on inventory we needed for that particular job. Sometimes when we were lacking a particular upgrade, we left what they had in place. Other times we tried to make an acceptable substitute (changing a 100 watt incandescent lamp out for a 60 watt equivalent LED, with customer approval...in one case we replaced a 250 watt bulb with a 60 watt equivalent, a drop of 241 watts). A few times we returned to a home after getting more inventory, but this was difficult with the service in such high demand. As LEDs become more available and more affordable, these issues should become easier in the future.

Barriers to Adoption and Strategies for Improvement.

Lack of Trust. General lack of trust was one of the biggest barriers faced by our team, especially in door-to-door marketing. However, we occasionally experienced lack of trust even when someone had been referred by a friend or family member and they had requested the service. The biggest issue was that people presumed we were running a scam, and when we told them we weren't selling anything, they jumped to the conclusion that we were using the opportunity to "case" their home for a future robbery. We found that three of Hawaii's major media sources, including KHON2, Hawaii News Now, and the Honolulu Star-Advertiser had all run stories about door-to-door scams in the last five years. Usually these scams entailed people allegedly selling magazines or security systems, but it explains a heightened sense of distrust. Hawaii's Fraud Prevention and Resource Guide, a publication put out by the State of Hawaii in 2008, addresses person-to-person fraud saying, "Remember - 'If it sounds too good to be true, it probably is.'" (State of Hawaii, 2008, pg. 15). The updated 2015 version of this publication does not contain this statement, but does warn against free lunch or dinner seminars. In light of this media attention and direct warnings from the state, it's understandable that people would think this free program sounded suspicious. Having the Hawaii Energy logo and printed materials was helpful, but still did not convince many skeptics. One of the few strategies that worked was to change outside lighting for residents first, showing them the value, and being prepared to leave. At that point, some of the residents had asked enough questions and seen the products and our service in action, and then allowed us into the home to finish the job.

Localism. Another potential barrier to adoption was the localism that exists in Hawaii. Hawaii is extremely ethnically diverse and has neighborhoods that can be predominantly populated by one main ethnic group. Often in Hawaii, there can be a lack of acceptance or trust (especially in a door-to-door situation) of someone who doesn't look like they're from the neighborhood. The best ways to overcome the barrier of localism are to build a customer base by referral, to build long-term relationships in the community, or to hire someone who looks and speaks like they're from the area. For the purposes of this project, however, none of these solutions were particularly feasible, and therefore many hard-to-reach homes in these areas that could have benefitted from this program were not serviced. Future such programs would benefit from the potential solutions above.

Concern Over EMF (Electromagnetic Frequency). One somewhat vexing challenge that new technologies always face is for those people who tend to have an aversion to change. In the case of LEDs, there are a number of people who have championed the "lightbulb freedom" movement to help people keep their incandescents, in some cases alleging that there are harmful electromagnetic frequencies (EMF) coming from LEDs and CFLs (as well as dimmer switches, smart meters, and other home efficiency products). There is no scientific evidence as to any danger presented by LEDs (or any of these other devices), but we had a fairly significant number of people turn down LED upgrades for exactly this reason. Interestingly, one of the few peer-reviewed studies we were able to find on the matter was from the Journal of Psychosomatic Research that discovered that those dealing with 'environmental intolerance' around EMF and other electromagnetic issues tended to have higher tendency towards behaviors such as obsessive/compulsive behavior, interpersonal hypersensitivity, hostility, phobic anxiety, and paranoid thoughts.⁶ Future programs of this type would benefit from having print materials documenting the complete lack of scientific evidence on the matter, and perhaps pointing out the

⁶ [http://www.jpsychores.com/article/S0022-3999\(16\)30042-3/abstract](http://www.jpsychores.com/article/S0022-3999(16)30042-3/abstract)

political motivations of proponents of incandescent bulbs, as well as a great deal more public education on the matter.

Perception of Low Quality. Our team frequently met with resistance to conservation measures because of people's perception that "efficient" also means lower quality. Many people were hesitant to even try the high-efficiency shower heads either because of a bad past experience with "low-flow" fixtures or a perception that they would have drastically reduced water pressure. We also ran into a fair amount of people who thought that CFLs were the best option for energy efficiency. Many of these people claimed they didn't like or want high-efficiency lighting installed, because they thought the bulbs were ugly or that they took a while to come up to full brightness. While these things may be true of CFLs, the LED bulbs are generally much more appealing to residents once they see the difference. Our best tool for confronting this type of resistance was to carry high-quality products that performed equally or better than the old, inefficient product. Once people realized they did not have to sacrifice quality to save money, most happily adopted the upgrades. Another strategy was to tell people we could install it and they could observe or test it out before making a final decision. We called this a "test drive" so that they would understand the idea that if they didn't like it, we would put the old one back, no problem. Residents were almost always willing to try something if they knew they could have their old reinstalled on the spot.

"The energy-saving LED lighting totally exceeded my expectations. I was blown away by how much warmer and more natural LED lights are than fluorescents and they don't radiate as much heat as my old incandescent bulbs did. I couldn't be happier." - Adam G., Honolulu

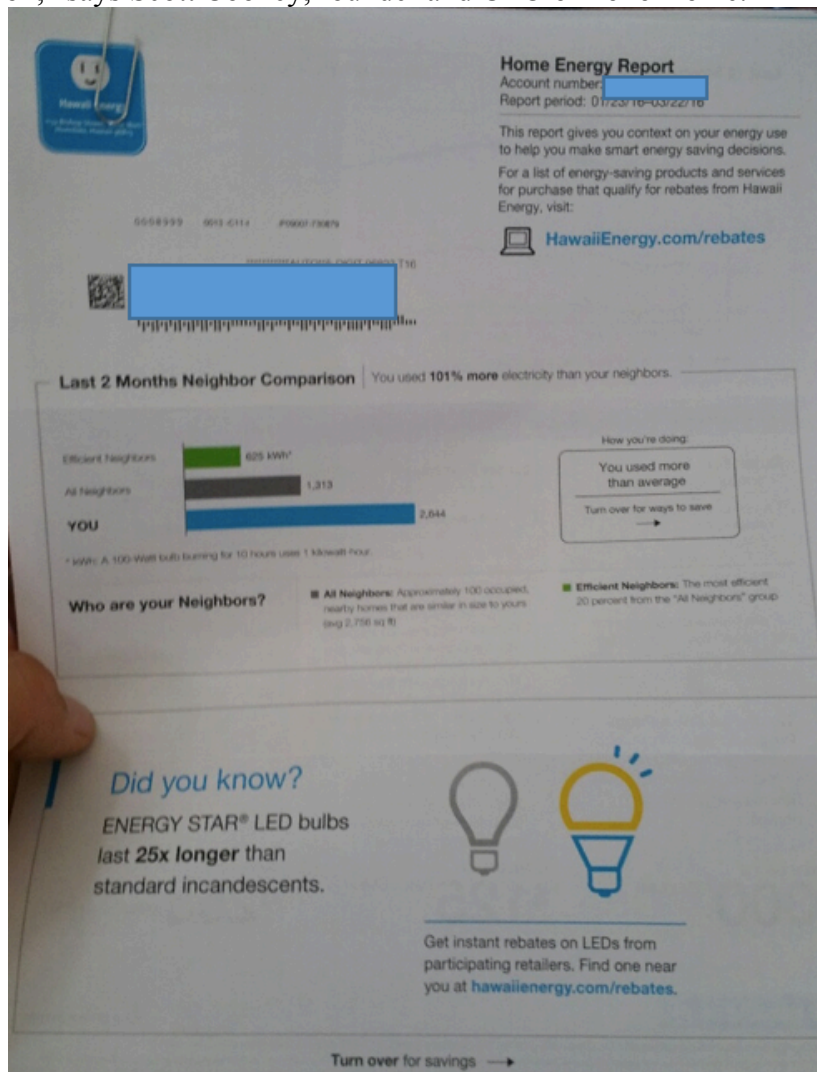
"I absolutely love my new showerhead! It feels great and has even more pressure than my last shower. Thank you!" - Asia Y., Honolulu

Examples, Anecdotes, Case Studies, and Testimonials

In addition to the useful insights gleaned from the post-service survey, we also learned some very interesting information in the field from our encounters, interactions, and conversations with residents while doing services. These examples, testimonials, anecdotes and conversations cannot be quantified and are not scientific in methodology, but we have included several that are indicative of key findings and take-away points from our experience. In this section we also use quotes from our survey that support our findings.

Evidence in support of Opower. Generally speaking, our technicians found that some residents were more familiar with Hawaii Energy than others. Many residents recognized Hawaii Energy as "those people who tell me how I compare with my neighbors on energy efficiency." Anecdotally, this was helpful in getting people to adopt whatever we were telling them would help them get more in line with their neighbors. "All of our technicians reported working with at least a few customers who had a Hawaii Energy / Opower report showing that they were using more energy than their neighbors, and it seemed to clearly motivate them to do better. Having

already seen information about LEDs, they were warmer to receiving them as installations than they might otherwise have been. There is a rule of thumb in marketing that people need to hear about you 7 times before they adopt your product, and I believe hearing about it in an official way with a letter from Hawaii Energy was effective at being one of those initial points of education,” says Scott Cooney, founder and CEO of Pono Home.



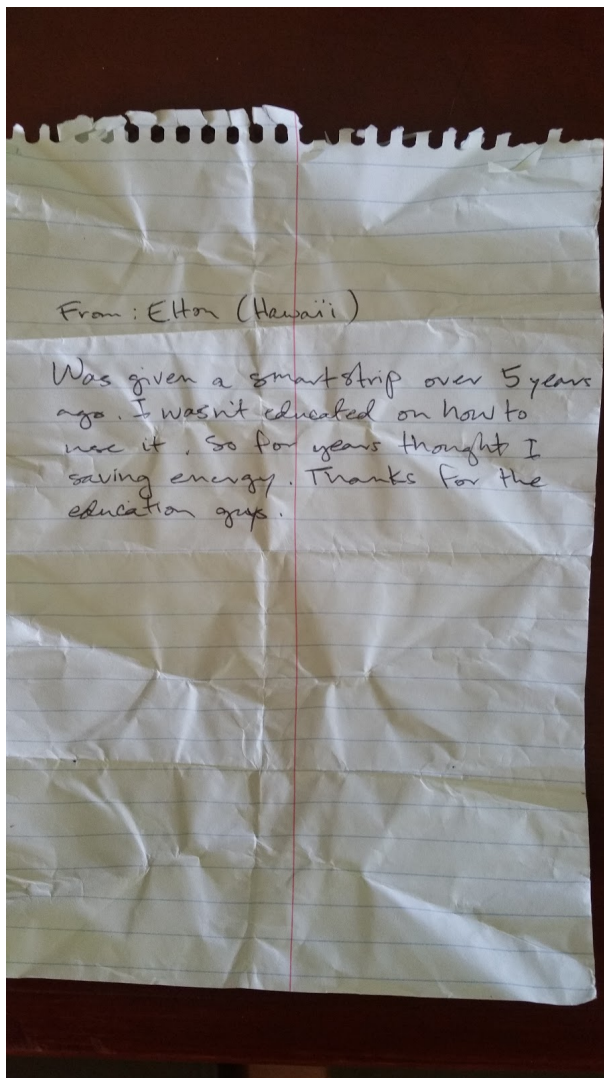
The Direct Install Difference. We saw a lot of incidences of products that had been given out by utilities or other companies as energy or water savers. Some had been installed, though many times incorrectly or in a way that was not quite the intended outcome (e.g., a 5000K A19 CFL in a dimmable recessed can where a BR30 should have been). An anecdote from one of our technicians was fairly typical of these types of exchanges:

“As I was changing light bulbs in one home, the resident approached me with a bag of the energy saving products - an LED bulb, a shower head, faucet aerator, and advanced power strip. The resident asked me if those were the products I was installing. I confirmed that they were and asked her where she had gotten them. She said they handed out energy efficiency kits at work, but she didn’t know who it was from or how to install the products. I proceeded

to explain to her about Hawaii Energy's various programs, how each item saved electricity, and let her watch as I installed each one. We were both glad to see the products put into their good and proper use." -Sarah DePhillips, Pono Home Technician.

A common theme encountered in homes serviced during this program was that of having APS either not being used, or being used incorrectly. A very typical example was from a resident in Waianae, who already had an APS set up in their home. They had two cords plugged into the "always on" outlets, with nothing in the control or switched outlets. These "always on" plugs function as any normal power strip, and energy savings are only achieved when appliances are plugged into the control and switched outlets.

"Was given a smart strip over 5 years ago. I wasn't educated on how to use it. So for years I thought I was saving energy. Thanks for the education guys," -Elton, Waianae.



All of our service technicians encountered unused efficiency products in homes during this program, some of which may have been given out during public education events, but for one reason or another, had not been installed by the resident. It was not uncommon to find a

package of brand new CFLs in the cupboard and incandescents still in the fixtures. These examples highlight some potential advantages of direct-install programs over handing out products. In hand-out programs, the resident does not always receive education on the efficiency hardware. If they do receive education, that doesn't mean they will necessarily understand or remember how to set it up when they get home. With the direct install program, there's no question about whether or not the products get set up correctly because the technician does the install. In the case of APSs, the resident also receives hands-on education from the technician during the install. Given the results of our survey questions 4 and 5, it is clear that APS are not typically understood by a customer intuitively, but that with a little education time, the grand majority of people believe they will have no problem installing one in the future.

Other Quotes and Testimonials:

"Pono Home allowed me to take one small step in becoming a better steward of Hawaii by being a more mindful consumer of water and energy." — Neenz F.

"Pono Home offers an amazing service to help make your home energy efficient....We thought we were energy efficient and Scott ended up changing 22 lightbulbs, 2 faucets, [and] 4 shower heads....One word to describe our experience...happiness." - Terry and Gary J., Nuuanu

From Facebook:

"Just had our entire place retrofitted by Pono Home with LED lights and other energy/water saving devices. Now, I will have more money for beer. Woohoo! It pays to be green." - Nathan A. (via Facebook)

"CJ was in yesterday to get our home more energy efficient. Replaced about 70 incandescent lamps with LEDs...all free!! Every room is brighter now with the new lamps...and we'll be using only about 1/6 of the power. Looking forward to the savings!! Thanks Pono Home for making this program available. Your installer CJ was great...knew the program and made sure we were using the most energy efficient devices." - Jim M. (via Facebook)

From Yelp:

"Pono Home provides an excellent service, reducing your energy bill while also making a greener, more efficient world. The process is completely painless, quick, and effective, and coordinating with the Pono Home team was an enjoyable experience! Thanks Scott!!" - Emily M. (Yelp)

"Just had CJ from Pono Home come to our house and he was awesome!! We have a new home but there were still lots of old style light bulbs and low efficiency water fixtures that he replaced. All free!! What a deal. CJ also gave us helpful tips on how to save energy and water. So happy he stopped by. I know many of my friends/family could benefit from this program and I just told them about it but the program ends soon so better hurry. Thanks again CJ and Pono Home." - Bert R. (Yelp)

From our Survey:

"I thought the service was awesome. It was educational, helpful and very professional." Arleen V., Board Member, Surfrider Foundation.

"We are more conscious of the use of electricity since Pono Home's visit." – Anonymous (survey)

“The lightbulbs are expensive and I am grateful for your support!” –Anonymous (survey)

“We feel we are conserving more water due to Pono Home's help.” –Anonymous (survey)

“I was very excited to be a part of an energy efficiency program funded by consumers like myself.” –Anonymous (survey)

“My water bill went down 25%!!” –Anonymous (survey)

“Very impressed with all that was offered and installed. Loved the showerhead and LED bulb options for indoor and outdoor! Power strip is pretty cool and updated too!”-Anonymous (survey)

Other Key Findings

Hard-to-Reach Fixtures. A common observation was that people changed the easy-to-reach bulbs and fixtures first. Many residents had heard about high-efficiency lighting and had changed the “low-hanging fruit.” However, many people procrastinate changing bulbs in fixtures that are either hard to reach or that have an unusual bulb shape or base size. When people had obviously started to make the transition to high-efficiency lighting, it was usually B11s, recessed lights, and outside lights that were the last to be changed. In some homes, these difficult bulbs may never get changed due to a person’s lack of knowledge, tools, or physical ability. In these cases, a direct-install program performed by trained technicians is one of the only ways the work will get done.









A case in which the outside lighting corroded and the screw base detached from the bulb, and needed to be removed from the fixture with needle nose pliers.

Connecting the Dots with Refrigerator Bulbs. Another point of interest was the demonstrative power of incandescent bulbs in the refrigerator. Refrigerator bulbs become too hot to touch within a few seconds of turning on - even though they're designed for a cold environment. While the refrigerator bulb is not one that gets a high number of hours of use in a home, it wastes energy in two ways, and therefore was something we proactively tried to replace. For the resident, this was often an amazing revelation that helped us convince them of changing other lights throughout the home, especially in an environment where most people are trying to keep their homes cooler. Technicians would explain how the refrigerator would have to work harder just to compensate for the heat put out by that small bulb. Consequently people would

quickly extrapolate that concept to the bulbs in their home and (for some) how much harder their air conditioning was working to compensate for the heat.

Some of our survey respondents commented:

“I didn't realize how much cooler the LED lighting is in the refrigerator.”

“The light bulb in the fridge can heat up the fridge and make it less efficient, so the LED can reduce cost because it's a cool light.”

“I can't get over how much cooler the fridge lights are now.”

Fire Hazards. Our technicians also encountered some cases where the electrical setup was potentially creating a fire hazard. Sometimes this was caused by a high-wattage bulb being installed in a low-wattage socket. Other times it was proximity of a flammable material to an incandescent bulb. We found numerous heavily grease-coated bulbs in oven hoods. In all these cases, the fire hazard should be reduced by installing a low-heat LED bulb.

One survey respondent commented:

“When Scott replaced one of the lights he showed us how the old light was burning the light fixture..... Really happy that he showed this to us.”







Multi-Family Units. Multi-family work has received more attention in energy efficiency programs in the past, and is far more lucrative for energy efficiency contractors than single-family work. There are advantages for energy efficiency contractors in terms of scheduling, recruiting, paperwork, and permissions/entering the property. In this pilot, we only worked on one multi-family housing project (though many of the individual homes we did are classified as multi-family, those were scheduled, recruited, and serviced as individual homes, not as a grouped property of homes). The one managed property Pono Home did work for in this program was Kekuilani Gardens in Kapolei, HI. This property has 56 apartments of low-income residents managed by a property management company that opened the door for all units and guided our technician through each. We were able to do relatively average jobs in each of those apartments while completing more of them per labor hour by a factor of almost 4x. This points to the challenge of bringing a financially sensible, residential direct install program beyond these multi-family units, especially in geographic areas where electricity is relatively inexpensive.

Waste. One of the greatest challenges for Pono Home was dealing with the waste created by the program. Because of our holistic approach to sustainability, waste reduction is always a goal in our work. However, finding a sustainable solution for disposing of 10,000+ incandescent light bulbs on an island isn't an easy fix. In the future we would like to find a way to recycle the materials removed from homes. Additionally, the packaging of new products becomes a secondary waste stream. While we tried to purchase bulbs in cardboard instead of plastic, this was not always a readily available option.

Value in Education. One of the most rewarding and impactful parts of this service was the one-on-one time our technicians spent directly educating Hawaii residents about energy conservation. Technicians taught residents about the products they were installing, how they would see the reduced wattage translated into their electric bill, and other ways they could save energy around the home. Often, residents were engaged and interested in learning how to save

money on their utility bills. Appendix A shows a one page sheet with energy-saving tips for residents that was designed leave-behind in this program. Our survey also yielded many positive responses regarding education:

“I thought the service was awesome. It was educational, helpful and very professional.”

“Great! Educational! Win-win”

“I love Sarah educated not only me but my kids as well!”

“It was really great and very convenient. I liked that I learned and received water saving technologies that I did not know about.”

“Learned about the smart strip and want to buy more!”

“Great service. Learned a lot with no strings attached!”

“I especially learned that simply turning off the TV and cable and VCR still used electricity.”

“We learned we weren't as energy efficient as we thought and made corrections”

“Tristan was very quick and efficient with removing and installing the lights. He educated me along the way of the effects that the new bulbs have with saving me money on my bills and also with the new faucet heads.”

Conclusion and Recommendations

This program was a groundbreaking new way of reaching Hawaii residents with energy efficiency measures, eliminating the barriers of cost, lack of knowledge, and inconvenience. The impacts of the program are far-reaching, including the energy and water saved as well as the number of people educated about efficiency products and practices.

We had many significant findings throughout the course of the program. Two things that stood out from the survey were that the educational component of the service was extremely important and that people generally were very satisfied with the products, despite some resistance to efficient products at first. We also learned that free programs are not always well-received, and that some legitimacy needs to be added whether through a well-known organization or through the referrals of family and friends. Our biggest challenges were time constraints, inventory management, gaining trust, and waste disposal. From our findings, we would make the following recommendations for future programs of this kind:

1. Focus on products people love. Resistance to change is natural, and combined with past conservation programs around the world that inserted water flow restrictors or installed poor performing low-flow devices and dull or unusual color compact fluorescent bulbs, there was a lot more selling involved in making changes for people than we expected.
2. Offer a “test drive”. People want to feel empowered and want to feel like their concerns are being met. Allowing people to see a particular product in action with no obligation to keep it was a powerful tool in getting people to say yes. Adding this “test drive” onto great products saw tremendous results—all of our technicians reported seeing people go from exceptionally dubious to delighted on a regular basis once they saw high performance LEDs and beautiful, high pressure showerheads as upgrades they could choose, and not as sacrifices.
3. Give the program public support. Having the Hawaii Energy logo was important in convincing people this program was legitimate, but in the future, having programs like this publicized on utility websites or being run through utilities or utility programs will help alleviate the biggest objection we faced.

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Appendix A: Program Partners

Pono Home. Pono Home is a Honolulu based company dedicated to helping people live healthier, more sustainable lives. The Company was founded to do energy and water efficiency in the residential and small business sectors. Founder and CEO Scott Cooney created Pono Home as a solution to greening these underserved markets through a packaged offering of convenience and a high return on investment. Although Pono Home offers a wide array of sustainability work, one main focus of the company is to help people lower their utility bills by installing high-efficiency upgrades that conserve energy and water. Pono Home was selected by the world's largest cleantech incubator, Energy Excelerator, as part of its 2014 Go-To- Market and 2016 Demonstration cohorts to help wean Hawaii, and the world, off of fossil fuels.

Energy Excelerator. Energy Excelerator is a startup program dedicated to helping solve the world's energy challenges, starting in Hawaii. The program helps innovative companies with funding up to \$1M, strategic relationships, and a vibrant ecosystem of partners. To date, they have awarded \$15M to 42 portfolio companies and launched 14 demonstration projects in Hawaii and the Asia Pacific. Portfolio companies have gone on to raise \$223M in follow-on funding and scale their Energy Excelerator demonstration projects to larger markets. Their dual-track program is primarily funded by U.S. Office of Naval Research, U.S. Department of Energy, the State of Hawaii, and its corporate sponsors, GE Ventures, Hawaiian Electric Industries, Vector, Blackstone Charitable Foundation, DENSO, and Mathworks. Energy Excelerator operates as a program of the Hawaii-based non-profit, Pacific International Center for High Technology Research.

Hawaii Energy. Hawaii Energy is the ratepayer funded conservation and efficiency program for Hawaii, Honolulu, and Maui counties administered by Leidos Engineering, LLC under contract with the Hawaii Public Utilities Commission. Hawaii Energy offers rebates, as well as training and educational opportunities, to help residents and businesses save money on their electric bills and reduce the state's dependence on imported oil. The program is independent of the utilities. Hawaii Energy fully funded this direct install pilot program.

Kanu Hawaii. Kanu Hawaii is a 501(c)3 nonprofit based in Honolulu that empowers social change using island-style activism and personal commitments to build a better future for Hawaii. Pono Home and Kanu Hawaii previously worked together in 2014, under contract with Hawaii Energy, on developing home energy efficiency statistics and educational materials to educate Hawaii residents on energy-saving tips through a social media campaign. Kanu Hawaii has been a supportive partner for Pono Home in trying to bring sustainability education and home efficiency solutions directly to Hawaii residents, especially "hard-to-reach" demographics including lower income individuals and people for whom English is not a first language. The Kanu Hawaii team helped Pono Home promote the free home efficiency pilot program, and sent out e-blasts and posted on Facebook for their 50,000 followers and members.

Appendix B: Survey Text

Survey Text

Below we have included the complete survey text:

Follow up survey about your home efficiency service from Pono Home
3 minute survey and 15 prizes!

We appreciate you choosing Pono Home for your home efficiency service, and we hope you are enjoying a reduced utility bill, brighter lighting, and a more "pono" home. We'd love to hear your thoughts on our service, and will be choosing 15 respondents (at random) to receive free gifts as a thank you for filling out the survey. Prizes will include movie tickets, grocery gift cards, and copies of Scott Cooney's book *Green Living Ideas*, which can help you save money and live healthier for life!

*1. How would you rate your level of understanding of energy efficiency....

	Very Little	Fairly Low	Moderate	Fairly high	Very high	N/A - not applicable
BEFORE Pono Home's service						
AFTER Pono Home's service						

Comments: _____

*2. How would you rate your level of understanding of YOUR HOUSEHOLD LIGHTING and its effect on your energy bill....

	Very little	Fairly low	Moderate	Fairly high	Very high	N/A - not applicable
BEFORE Pono Home's service						
AFTER Pono Home's service						

Comments: _____

*3. How would you rate your level of understanding of WATER EFFICIENCY and its effect on your energy bill....

	Very little	Fairly low	Moderate	Fairly high	Very high	N/A - not applicable
BEFORE Pono Home's service						
AFTER Pono Home's service						

Comments: _____

*4. How would you rate your level of understanding of HOW A SMART STRIP SAVES YOU ENERGY....

	Very little	Fairly low	Moderate	Fairly high	Very high	N/A - not applicable
BEFORE Pono Home's service						
AFTER Pono Home's service						

Comments: _____

*5. If you had a smart strip installed, and now had to move it, would you be able to set it up correctly?

No way.	Not likely.	Maybe.	Probably.	Absolutely.	N/A - I didn't have a smart strip set up in my home.
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*6. How would you rate your level of satisfaction with the following products installed in your home by Pono Home?

	Not satisfied	Somewhat unsatisfied	Neutral	Somewhat satisfied	Love it!	N/A - not applicable
LED lighting						
High efficiency faucet fixture						
High efficiency showerhead - standard						
High efficiency showerhead - handheld						
Advanced Power Strip (also known as a Smart Strip)						

Comments:

*7. From what was installed in your home by Pono Home, what savings do you expect to see on your utility (electric and water) bills?

Little or none	5%	10%	15%	20%	25+%	N/A, or I don't pay my utilities directly
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*8. Which of the following did you learn during your Pono Home service? (Check all that apply)

- How watts translate into money spent on your electric bill
- Incandescent bulbs use a lot more electricity than LEDs and therefore cost more to use
- Incandescent bulbs make your home hot whereas LEDs do not
- Fans cool people, not rooms, and actually waste energy if no one is in the room to enjoy them
- How to set up a smart strip
- Saving water often means saving energy, too
- Fridges are one of the biggest energy users in the home, such that having an extra fridge might be costing you hundreds of dollars a year
- Keeping doors and windows closed while running A/C is important to reduce your energy bills
- What else did you learn?

*9. Which of the following was the MOST IMPORTANT thing you learned during your Pono Home service?

- How watts translate into money spent on your electric bill
- Incandescent bulbs use a lot more electricity than LEDs and therefore cost more to use
- Incandescent bulbs make your home hot whereas LEDs do not
- Fans cool people, not rooms, and actually waste energy if no one is in the room to enjoy them
- How to set up a smart strip
- Saving water often means saving energy, too
- Fridges are one of the biggest energy users in the home, such that having an extra fridge might be costing you hundreds of dollars a year
- Keeping doors and windows closed while running A/C is important to reduce your energy bills

*10. Are you aware that Hawaii Energy will pay you for an old, inefficient refrigerator and that removing it from your home will greatly reduce your electric bill? [Here's the link to learn more](#) (opens in another tab so you won't lose this survey)

- Yes
- I wasn't, but I am now!

*11. Who was your Pono Home technician(s)? (You may check more than one)

- Tristan
- C.J.
- Sarah
- Scott
- Anthony
- I don't remember

12. Would you be interested in free, ongoing education on green living to help you improve the health of your home and reduce your utility bills?

- Yes
- Maybe
- No

13. If you are interested in ongoing education, what would be your preferred method? (Check any/all that apply)

- A series of online articles and short videos
- An email newsletter
- A printed book or booklet
- In-person workshops
- A recommended list of full-length documentaries about sustainability
- Other ideas...

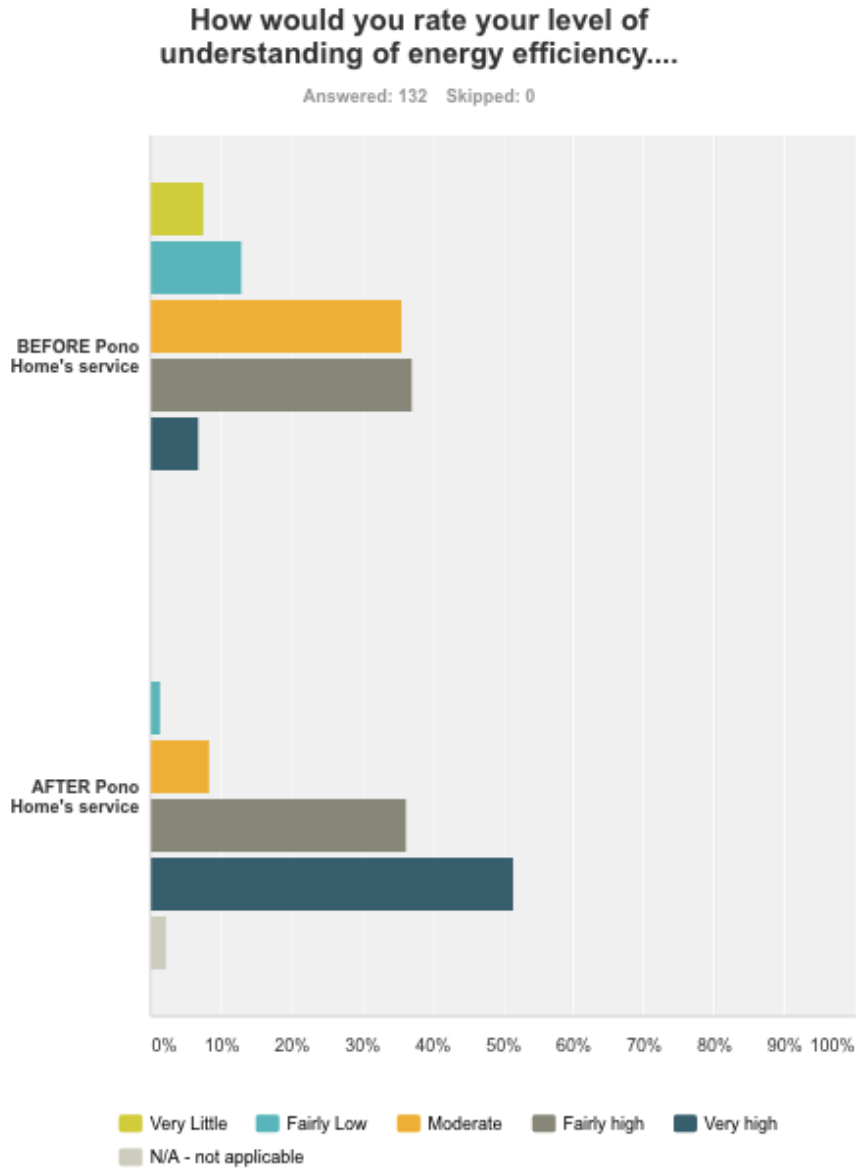
14. What did you think about the service? Please be specific if possible...we love to hear testimonials. Also, what are your recommendations of how we can improve the service offering?

15. If you'd like to be entered into our random prize drawing, please enter your contact information below.

- Name
- ZIP/Postal Code
- Email Address
- Phone Number

Appendix C: Survey Results

Question 1:

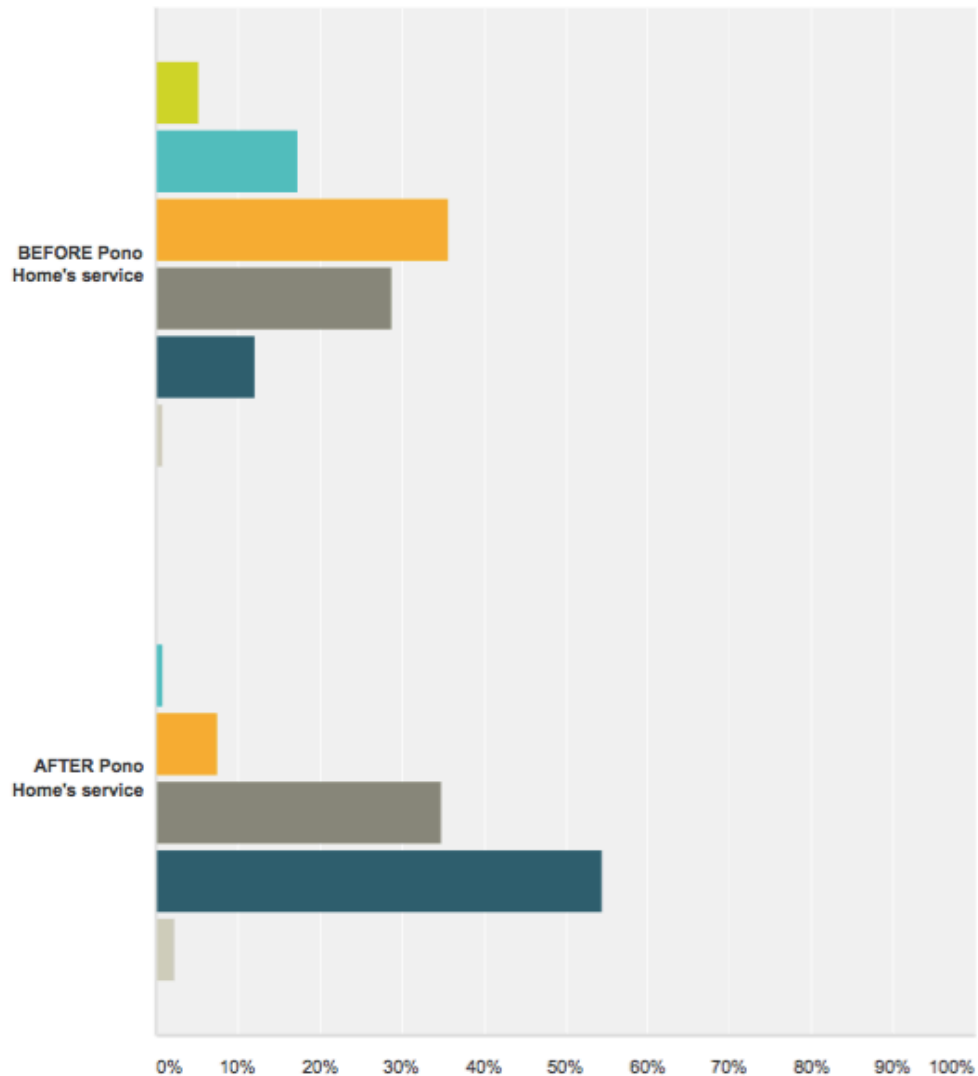


	Very Little	Fairly Low	Moderate	Fairly high	Very high	N/A - not applicable	Total
BEFORE Pono Home's service	7.58% 10	12.88% 17	35.61% 47	37.12% 49	6.82% 9	0.00% 0	132
AFTER Pono Home's service	0.00% 0	1.52% 2	8.33% 11	36.36% 48	51.52% 68	2.27% 3	132

Question 2:

Q2 How would you rate your level of understanding of YOUR HOUSEHOLD LIGHTING and its effect on your energy bill....

Answered: 132 Skipped: 0



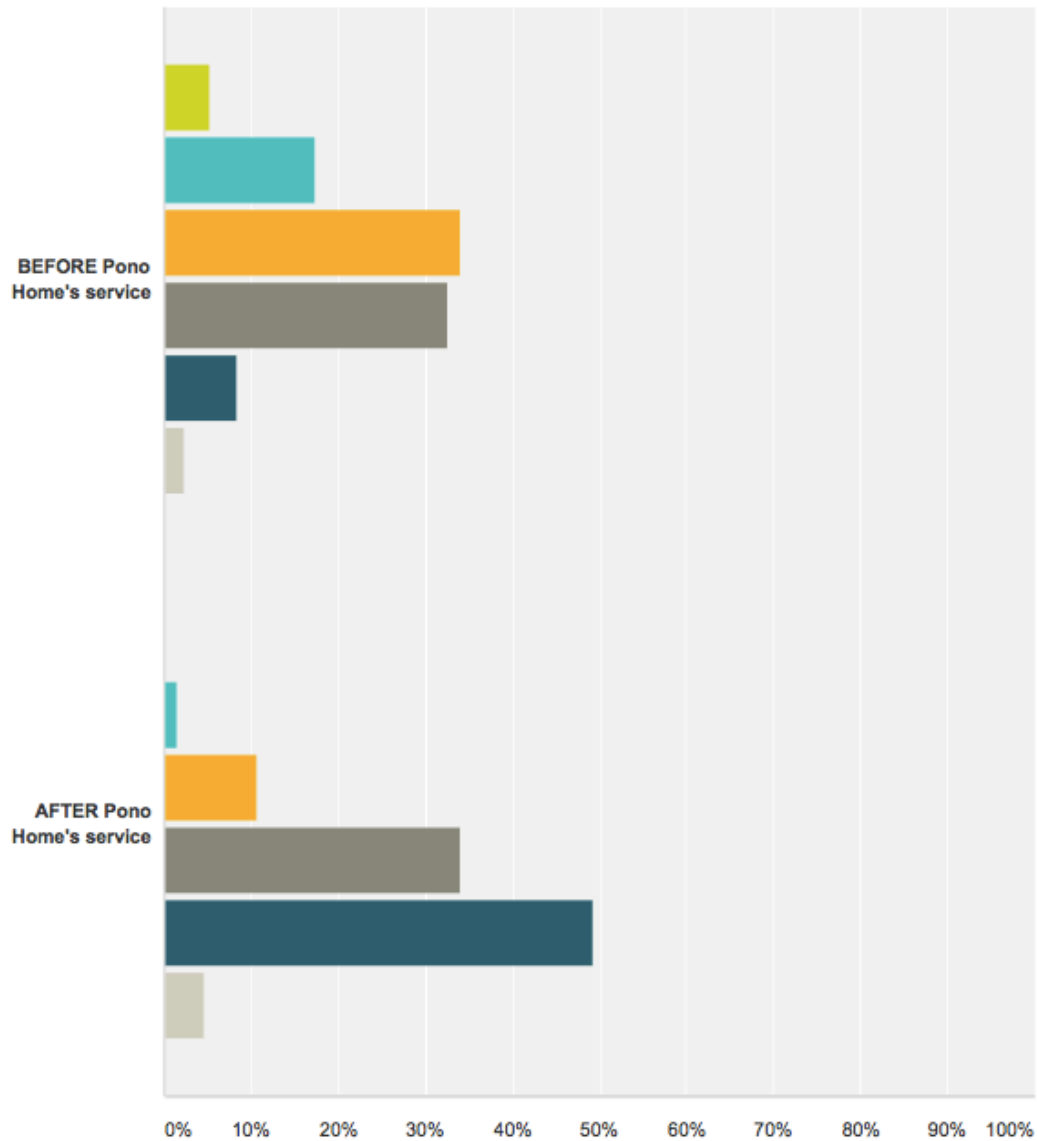
Very little Fairly low Moderate Fairly high Very high
N/A - not applicable

	Very little	Fairly low	Moderate	Fairly high	Very high	N/A - not applicable	Total
BEFORE Pono Home's service	5.30% 7	17.42% 23	35.61% 47	28.79% 38	12.12% 16	0.76% 1	132
AFTER Pono Home's service	0.00% 0	0.76% 1	7.58% 10	34.85% 46	54.55% 72	2.27% 3	132

Question 3:

Q3 How would you rate your level of understanding of WATER EFFICIENCY and its effect on your energy bill....

Answered: 132 Skipped: 0



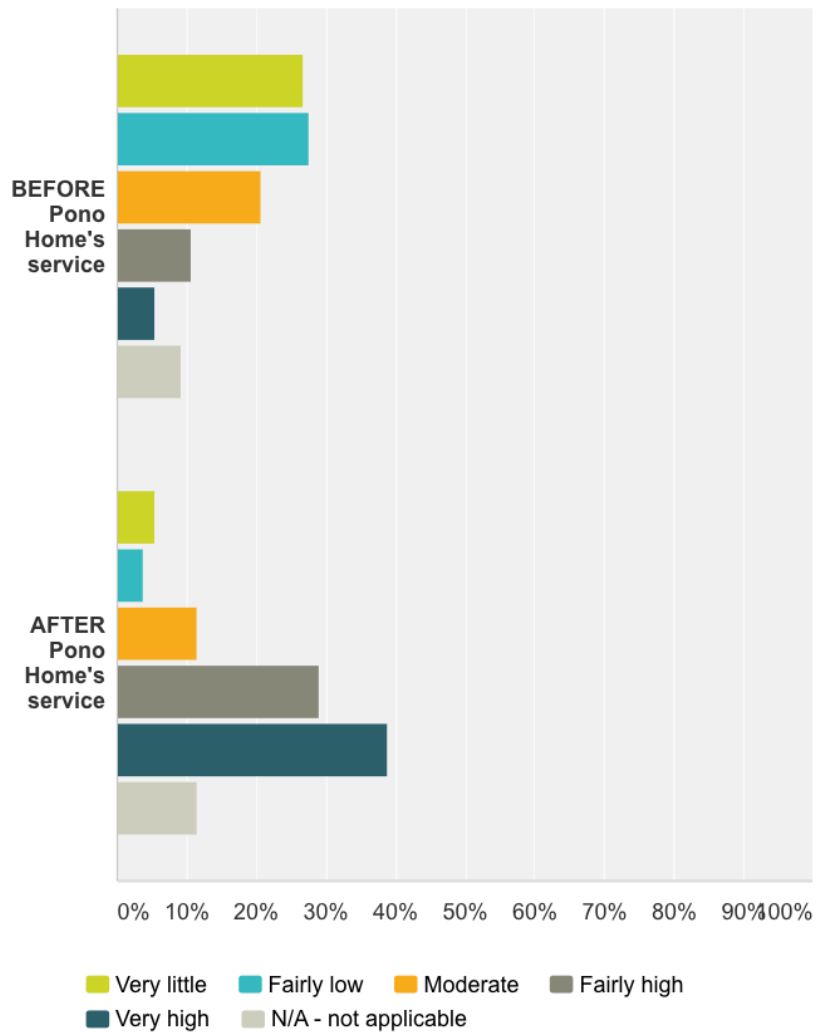
Very little Fairly low Moderate Fairly high Very high

	Very little	Fairly low	Moderate	Fairly high	Very high	N/A - not applicable	Total
BEFORE Pono Home's service	5.30% 7	17.42% 23	34.09% 45	32.58% 43	8.33% 11	2.27% 3	132
AFTER Pono Home's service	0.00% 0	1.52% 2	10.61% 14	34.09% 45	49.24% 65	4.55% 6	132

Question 4:

How would you rate your level of understanding of HOW A SMART STRIP SAVES YOU ENERGY....

Answered: 131 Skipped: 0



	Very little	Fairly low	Moderate	Fairly high	Very high	N/A - not applicable	Total
BEFORE Pono Home's service	26.72% 35	27.48% 36	20.61% 27	10.69% 14	5.34% 7	9.16% 12	131
AFTER Pono Home's service	5.34% 7	3.82% 5	11.45% 15	29.01% 38	38.93% 51	11.45% 15	131

Question 5:

If you had a smart strip installed, and now had to move it, would you be able to set it up correctly?

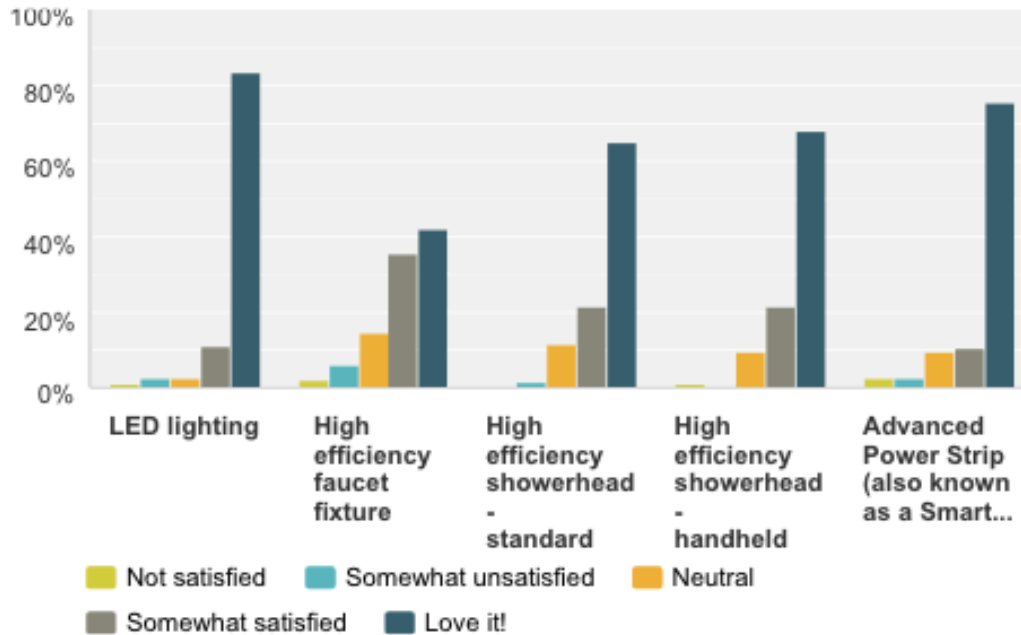
Answered: 123 Skipped: 0

No way. ▾	Not likely. ▾	Maybe. ▾	Probably. ▾	Absolutely. ▾	Total ▾	Weighted Average ▾
1.14% 1	2.27% 2	19.32% 17	31.82% 28	45.45% 40	88	4.18

Question 6:

How would you rate your level of satisfaction with the following products installed in your home by Pono Home?

Answered: 132 Skipped: 0



	Not satisfied	Somewhat unsatisfied	Neutral	Somewhat satisfied	Love it!	Total
LED lighting	0.79% 1	2.36% 3	2.36% 3	11.02% 14	83.46% 106	127
High efficiency faucet fixture	2.04% 2	6.12% 6	14.29% 14	35.71% 35	41.84% 41	98
High efficiency showerhead - standard	0.00% 0	1.45% 1	11.59% 8	21.74% 15	65.22% 45	69
High efficiency showerhead - handheld	1.19% 1	0.00% 0	9.52% 8	21.43% 18	67.86% 57	84
Advanced Power Strip (also known as a Smart Strip)	2.33% 2	2.33% 2	9.30% 8	10.47% 9	75.58% 65	86

Question 7:

What savings do you expect to see on your utility (electric and water) bills, from what was installed in your home by Pono Home?

Answered: 132 Skipped: 0

	Little or none	5%	10%	15%	20%	25+%	N/A, or I have solar or I don't pay my utilities directly
(no label)	6.06% 8	14.39% 19	25.76% 34	19.70% 26	15.15% 20	9.85% 13	9.09% 12

Question 8:

Which of the following did you learn during your Pono Home service? (Check all that apply)

Answered: 132 Skipped: 0

Answer Choices	Responses
How watts translate into money spent on your electric bill	45.45% 60
Incandescent bulbs use a lot more electricity than LEDs and therefore cost more to use	62.12% 82
Incandescent bulbs make your home hot whereas LEDs do not	56.82% 75
Fans cool people, not rooms, and actually waste energy if no one is in the room to enjoy them	36.36% 48
How to set up a smart strip	46.97% 62
Saving water often means saving energy, too	62.88% 83
Fridges are one of the biggest energy users in the home, such that having an extra fridge might be costing you hundreds of dollars a year	34.85% 46
Keeping doors and windows closed while running A/C is important to reduce your energy bills	27.27% 36
Total Respondents: 132	

Question 9:

**Which of the following was the MOST
IMPORTANT thing you learned during your
Pono Home service?**

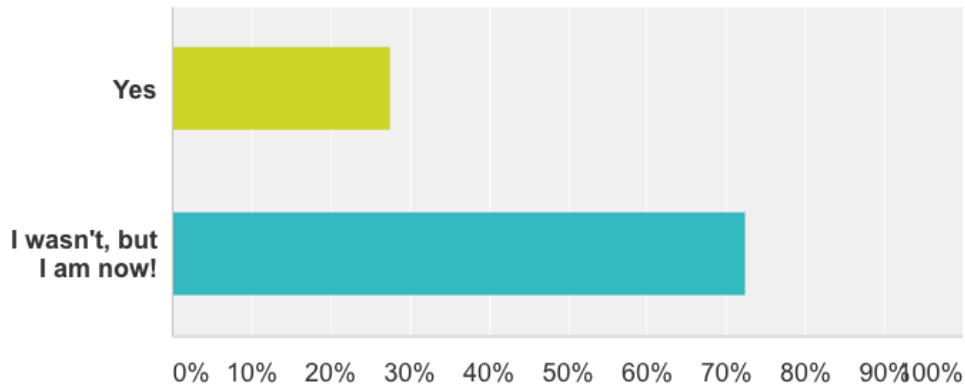
Answered: 132 Skipped: 0

Answer Choices ▾	Responses ▾
▾ Saving water often means saving energy, too	21.21% 28
▾ Incandescent bulbs use a lot more electricity than LEDs and therefore cost more to use	17.42% 23
▾ How watts translate into money spent on your electric bill	15.91% 21
▾ Incandescent bulbs make your home hot whereas LEDs do not	15.15% 20
▾ How to set up a smart strip	12.12% 16
▾ Fans cool people, not rooms, and actually waste energy if no one is in the room to enjoy them	9.85% 13
▾ Fridges are one of the biggest energy users in the home, such that having an extra fridge might be costing you hundreds of dollars a year	6.82% 9
▾ Keeping doors and windows closed while running A/C is important to reduce your energy bills	1.52% 2
Total	132

Question 10:

Are you aware that Hawaii Energy will pay you for an old, inefficient refrigerator and that removing it from your home will greatly reduce your electric bill? Here's the link to learn more (opens in another tab so you won't lose this survey)

Answered: 131 Skipped: 0



Answer Choices	Responses	
▼ Yes	27.48%	36
▼ I wasn't, but I am now!	72.52%	95
Total	131	

Appendix D: Educational Handout

More Home Efficiency Tips



1

Fans cool people, not rooms.

Running a fan while no one is in the room can actually make it hotter. So turn your fans off unless you are right there to enjoy them!



2

Use a clothesline or dryer rack.

Your clothes dryer is one of the biggest users of energy in your home, so to save money, consider hanging your clothes to dry on a dryer rack or a clothesline.

3

Stick to one refrigerator.

A second refrigerator can be a high energy user in your home. If you have a second refrigerator for just a few things, to save money, strongly consider selling it and using just one.



green
living
ideas

4

Read more articles on green living

How to set up a smart strip <http://bit.ly/1rAN1qT>

5 effective tips for drying clothes indoors <http://bit.ly/1qyyCGi>

Very low cost ways to keep cool <http://bit.ly/1LLzh0L>

And many more energy saving tips! <http://bit.ly/1PPWMeK>

5

Visit HawaiiEnergy.com for more information

Mahalo to Hawaii Energy for their support of the Free Home Efficiency Pilot Program. For more energy-saving tips and information on Hawaii Energy's residential and commercial conservation and efficiency programs, please visit **HawaiiEnergy.com**.



Hawaii Energy
YOUR CONSERVATION & EFFICIENCY PROGRAM



Want to learn more? For more tips on home efficiency and green living check out *Green Living Ideas for Your Pono Home*.
greenlivingideas.com/green-living-ideas-book/

PonoHome.com