

## Tailor-Made DSM: What vulnerable customers need from energy efficiency programs

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### ABSTRACT

Vulnerable populations, especially those with low or moderate incomes, senior citizens, or pensioners, and those with disabilities, are often overlooked in the energy efficiency program delivery. So too are the non-profit organizations that provide shelters and social services to these customers. As energy program administrators look for new strategies to engage with this customer segment, this paper summarizes the results from three separate process evaluations of programs targeting vulnerable populations. These evaluations highlight the challenges of delivering “traditional” energy efficiency programs to these populations and illustrate the adaptations required to ensure program success. The three programs profiled in this paper are:

- *Maryland Energy Efficiency Tune-Up (MEET) Pilot* in 2019 offered an innovative follow-up program that provides weatherization services to previous program participants. This program *new opportunities* for energy efficiency savings through no-cost energy efficiency upgrades, HVAC tune-ups, and behavioral tips.
- *Evergy’s Energy Efficiency for Non-Profits* takes another approach: targeting the organizations that provide social services to these vulnerable customers. The electric utility offers no-cost energy audits and lighting change-outs to organizations that give shelters to women and children in crisis. Evergy also doubles the rebate funds available to help non-profits make additional energy-efficient equipment upgrades to encourage deeper energy savings.
- *Energy Trust of Oregon’s Manufactured Homes Replacement Program* offers new manufactured homes to qualifying low and moderate-income customers. The program combines no-cost financing with homeowner education to help these customers move out of inefficient, older homes.

### Introduction

Vulnerable populations, especially those with low or moderate incomes, senior citizens, or pensioners, and those with disabilities, are often overlooked in the energy efficiency program delivery. So too are the non-profit organizations that provide shelters and social services to these customers. This paper summarizes the results from three separate process evaluations of programs targeting vulnerable populations. These evaluations highlight the challenges of delivering “traditional” energy efficiency programs to these populations and illustrate the adaptations required to ensure program success. They also provide valuable insights and some “best practices” that should be incorporated into program designs targeting this customer group.

## Maryland Energy Efficiency Tune-Up Program (MEET) Pilot Program

The MEET Pilot Program's overall goal is to help customers build upon the energy savings from previous weatherization activities and increase the overall energy savings for these low-income households. The program targets customers who received weatherization services through the Department of Housing and Community Development's (DHCD) Limited-Income Eligible Energy Efficiency Program (LIEEP). The program aims to offer previous program participants with additional ways to enhance the efficiency of their homes through small upgrades, tune-ups to HVAC systems, and behavior change. The MEET program activities include the following:

- Direct-install measures, such as lightbulbs, faucet aerators, showerheads;
- Air sealing;
- Adjustments to thermostat and water heater and refrigerator/freezer temperatures; and
- Maintenance activities (e.g., replacing air filters, cleaning refrigerator coils).

The pilot program ran for two years (2019 and 2020) in the city of Baltimore and was expanded to a statewide offering in 2021 (DHCD 2022, 8).

Although this program leveraged the experience of its current weatherization partners, the program also required additional contractor education to emphasize and encourage participant behavior change. Specifically, Maryland DHCD and the program administrator provided additional training to participating contractors focusing on how best to engage customers during the home site visit. The training emphasized the importance of framing energy savings opportunities in terms of their potential to deliver financial savings to customers, since this type of language best resonated with customers. The implementer drew on its extensive experience in operating other energy efficiency consumer behavior change programs to make the client training "fun" and engaging for program participants (Reeves et al 2019).

As part of this program, the contractor shared energy consumption data with each client. The contractor worked proactively to develop an approach that will lead to behavioral changes that will enhance overall energy savings. During the in-home visit,<sup>1</sup> the contractors engage with customers in the following ways:

- Review the Energy-Saving Behavior Change Pledge Form: Customers received a list of nearly 30 low/no-cost energy-saving behavior changes, organized from highest to lowest impact on energy consumption during the MEET Pilot Program application process. At the home visit, the contractor discusses any progress the customer has made with these behavior changes. The contractor will also identify energy consumption trends to illustrate the energy savings potential from these low-cost/no-cost actions.
- Complete the Home Visit Checklist: The contractor documents customer information, energy consumption collected on-site, measure installations, and recommendations for additional energy-saving opportunities. Where appropriate the contractor will also install the MEET measures such as lightbulbs and showerheads, and adjust the thermostat, water heater, and refrigerator/freezer temperatures. The contractor also will determine if an HVAC system clean-and-tune is appropriate for the home and, if so, refers the customer to the program implementer to identify an HVAC contractor to complete the update
- Provide additional leave-behinds: Customers also receive materials that provide information on additional income-eligible resources such as referrals for other state assistance programs and

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<sup>1</sup> Virtual visits were added as an option in 2021. One of the two required visits may be conducted virtually. Virtual services shall cover the same items as described in section 12.2.1 with the following exceptions: The visual inspection of the home is to be performed with the client's help; Direct install measures do not need to be performed, however can be shipped to the client. Photo documentation of installed measures is still required; DHCD *Energy Efficiency Program Operations Manual v.3-2021* pp. 162-163.

descriptions other low-income resources available within the city, to help reinforce the connection between this program and other low-income services (DHCD Energy Efficiency Program Operations Manual v.3-2021, 160).

### **Energy Efficiency for Nonprofits (EENP)**

The Efficiency for Nonprofits Program (EENP) offered by Evergy targeted 501(c)(3) to organizations that provide lodging and social services to low-income, homeless, or at-risk populations in the Evergy Missouri service area, so they can better serve these individuals and families. Lodging must be the facility's primary function. Satellite facilities associated with the headquarters organization are also eligible ([EENP Application](#)).

After reaching out to qualified organizations, Evergy's program implementer, ICF, will schedule and conduct a walk-through assessment of either the commercial or residential building of an eligible Evergy customer. The energy audit will be conducted by an Evergy Authorized Trade Ally. After the audit is completed, the auditor will prepare a "Summary Report," which will be shared with the customer. Each Summary Report contains the findings of the energy audit, a historical energy analysis, a review of energy-saving measures installed, and additional recommendations related to energy efficiency.

The program implementer schedules a follow-up visit to install eligible direct-install measures including interior and exterior lighting upgrades, Heating, Ventilation, and Air conditioner (HVAC) tune-ups, water conservation measures, and power strips. In addition, the organizations may also qualify for additional rebates or incentives based on the results of the energy audit ([EENP Application](#)).

### **Energy Trust of Oregon's Manufactured Homes Replacement (MHR) Pilot**

The MHR program targets<sup>2</sup> homeowners who live in old and outdated manufactured homes. In the United States, manufactured homes offer an affordable housing option for many low and moderate-income households. In Oregon, manufactured homes account for approximately 11% of its total housing stock (ODC 2020, p. 3).

But many of these homes predate 1976, which was when the first energy efficiency codes were enacted by the United States Department of Housing and Urban Development (HUD). Moreover, even newer homes constructed prior to 1994 also are highly energy inefficient. They were built with poor quality construction materials, minimal insulation in the walls, ceiling, and floors that lead to air leakage around doors and windows, and inefficient heating systems compared to conventional housing. More significantly, the energy costs per square foot in these older manufactured homes are nearly twice that for residents in similarly aged site-built homes (ODC 2020, p. 4).

Energy Trust of Oregon identified the need to replace pre-1994 manufactured homes in Oregon as many of these need significant repairs to address roof leaks, cracks in the walls, holes in the floor, mold, and pests. In their current state, these units are uncomfortable and potentially unhealthy to live in. To improve the overall quality of manufactured homes, Energy Trust deployed its Manufactured Home Replacement (MHR) Pilot in June of 2017 with the following goals:

- Refine understanding of savings and costs;
- Document non-energy benefits; and
- Establish a replicable partnership model between ratepayer-funded programs, housing organizations, and funders (ODC 2020, p. 5).

The MHR pilot was a collaborative effort among several stakeholders which included:

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<sup>2</sup> The pilot program ended in 2020 and the program became a formal offering in 2021.

- Energy Trust: Conducts outreach, coordinates stakeholders, supports households in the replacement process, and provides a financial incentive for qualifying replacements.
- CLEAResult: Implementation contractor who also conducts outreach and supports households in the replacement process.
- Craft3: Offers a low-interest loan for households who do not own their land. They conduct outreach, provide financial counseling, and support participants.
- Community and Shelter Assistance Corp. (CASA) of Oregon: CASA arranges financing and provides support to purchase manufactured home parks and establish them as cooperatives. CASA recruits new participants and provides support to homeowners.
- Earth Advantage: Conducts pre-inspections of manufactured homes to determine eligibility and support an energy savings impact analysis.
- NeighborWorks Umpqua: Purchases manufactured home parks and operates them as a nonprofit. Residents own their homes and lease the land. NeighborWorks helps homeowners in their park navigate the replacement process.
- The United Community Action Network (UCAN): UCAN is a Community Action (CAP) agency that offers funds in the form of a subsidy to qualifying households to facilitate their home replacement to qualifying low and moderate-income customers. The program combines no-cost financing with homeowner education to help these customers move out of inefficient, older homes (ODC 2020).

## Methodology

Each program administrator hired a third-party evaluation contractor to complete a process evaluation for these three programs. The research activities were completed by three separate contractors. Table 1 summarizes the scope of each process evaluation.

Table 1. Summary of process evaluations for the three pilot programs

Process Evaluation Activities	Pilot Program		
	MEET	EENP	MHR
Review of Program Documents	√	√	√
In-Depth Interviews with Program Staff	√	√	√
In-Depth Interviews with Program Stakeholders	√		√
In-Depth Interviews with Program Participants	√	√	√
Participant Surveys	√		√
Review of Program Database/Metrics	√		√

## Results

Each pilot program evaluation documented the successes and challenges with program implementation during the pilot year. These process evaluations also provided valuable feedback on ways to enhance, modify, and expand program operations when or if these programs move to full-scale program operations. The key findings for pilot program are summarized next.

## MEET Program Findings

### Key Successes with the MEET Program: Successes with the MEET Program

During the first year, the MEET pilot enrolled 101 participants. Unfortunately, the pilot’s timing coincided with the COVID-pandemic, and operations were shut down in the last half of the first year. These shutdowns continued to affect program operations as enrollment levels dropped throughout PY2020. However, the launch of the statewide program and the addition of new network partners increased participations during PY2021, albeit at a lower than projected level. Figure 1 illustrates the three-year enrollment patterns for both the pilot program (2019-2020) and the statewide program (2021).

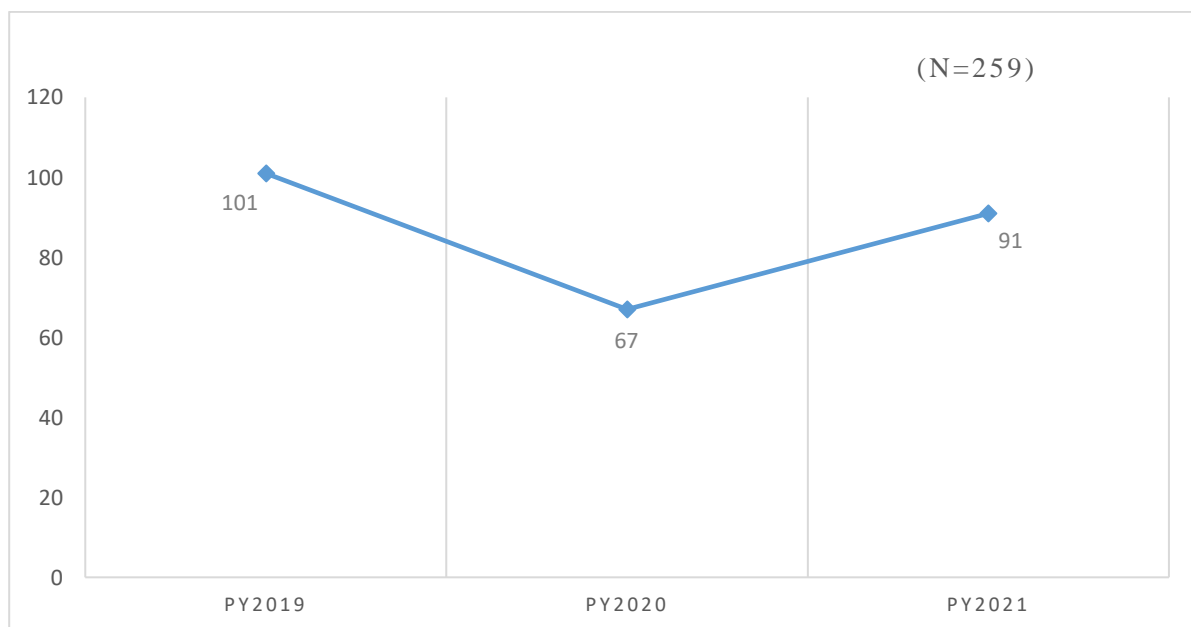


Figure 1. MEET Participation Rates 2019-2021: *Sources:* DHCD EmPOWER Limited Income Programs Semi-Annual Reports Q-1-Q4, 2019-2022

As part of the process evaluation, 19 of the 101 program participants completed a follow-up survey that gathered feedback regarding the pilot program during its first year. Overall, the feedback was positive for both the usefulness of the information provided by the contractor (87% rating it as “Very Useful”).

Qualitatively, the respondents indicated that the Energy-Savings Behavior Pledge led to changes in the way these used their appliances (61%), turned off lights and electronics (68%) and adjusted the thermostat (78%) (Cadmus 2020, pp. 18-19). Figure 2 summarizes the number of participants reporting that they completed each recommended behavior change. Due to the relatively small sample size, these findings should be viewed as directional rather than conclusive.

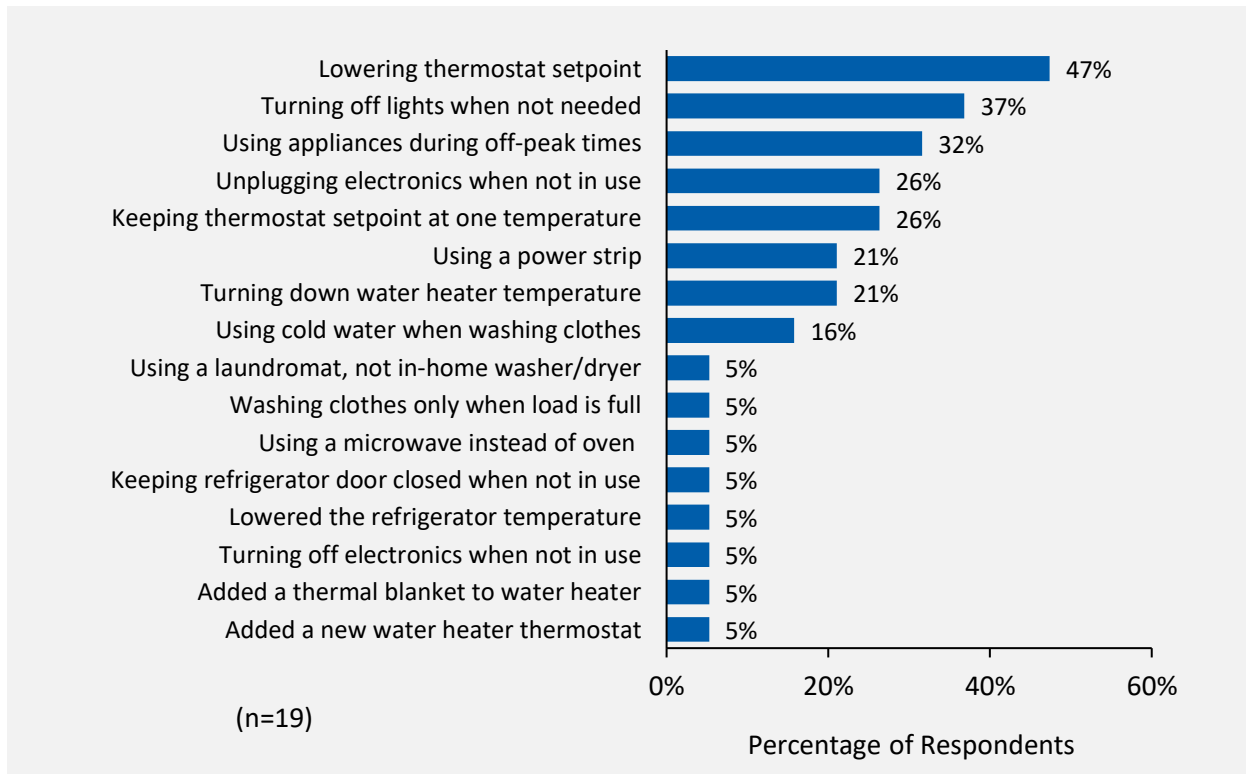


Figure 2. Summary of Behavior Modifications Reported by Participants; *Source:* Reeves et al. 2020, p. 21

**Challenges with the MEET Pilot Program:** As is often the case for low-income programs, some customers are hesitant to participate because the program “sounds too good to be true.” Customer skepticism, along with contractor reluctance, were the two biggest obstacles to the overall success during the pilot program’s first year. These challenges are summarized next.

- Participant recruitment was difficult. Securing customer enrollments presented the first challenge to reaching the 2019 participation goals for the MEET Program. There was a significant time lag between these customers' initial experience with the Limited Income Energy Efficiency Program (LIEEP) and the contact for the MEET pilot. In some cases, customers had not been contacted in several years since receiving their initial weatherization services, making them more hesitant to enroll in a new and unfamiliar program.

Although both programs have the same administrator, DHCD, many customers did not understand the differences between the two program offerings. Furthermore, LIEEP program participants no longer needed weatherization services, making them less likely to respond to the MEET program offering.

- Traditional marketing strategies were ineffective. The pilot program staff also had difficulties in recruiting participants through direct mail. Instead, the most successful tactics required the program implementers to use a more personal approach that included hands-on recruiting strategies, such as telephone outreach and door-to-door canvassing.
- They perceived “Stranger Danger:” The program implementation contractor noted that customers were reluctant to agree to have a stranger in their home to complete additional assessments and upgrades. The COVID-pandemic further exacerbated this issue. To overcome these concerns, DHCD modified the program to allow virtual visits to replace in-home visits to maintain program participation.

- Challenges with income-verification: Due to staff shortages and turnover, the program implementer did not have sufficient resources to complete the income-verification tasks. Customers must be qualified to participate in the program, so any delays in this qualification process create a ripple effect of delays across the entire program.
- Lack of willing HVAC contractors: Many trade allies were hesitant to participate in this pilot program because it involved completing work that typically falls outside traditional weatherization services. The biggest concerns were for not wanting to participate two-fold: 1) the price Maryland DHCD provided for a “clean-and-tune” was too low, and 2) the liability was too high for potentially damaging equipment during home assessments, especially refrigerator coil cleaning.

Specifically, contractors feared completing specific tasks because of the risk of accidentally damaging old equipment while moving or assessing it. Furthermore, contractors were also concerned about the risk of customers experiencing problems with the equipment shortly after the assessment and blaming it on the contractors.

Contractors also complained that the price they received for the clean-and-tunes was too low, so they were not interested in completing this service (Reeves et al., 2020).

**Mid-Year Course Corrections:** Based on early feedback from the program administrator and implementer, the DHCD staff made some necessary mid-course modifications to the pilot program, which included:

- Combining targeted direct mailings to customers in income-qualified neighborhoods with follow-up telephone calls. The program implementer reported that this two-pronged approach has effectively reached potential program participants while remaining cost-effective.
- Increasing the price paid for clean-and-tunes. The program administrator submitted a new higher proposed price for contractors beginning in 2020.
- Developing a “liability” waiver for the HVAC contractors that encourages contractors to complete the “clean and tune” while reducing their overall risk. As a result, Maryland DHCD requested that contractors carefully document existing conditions before beginning any work. The program implementer also created a liability release form to ascertain further that those contractors were not found responsible for faulty equipment that they did not cause.
- Educating the program staff and its contractors on the overall benefits of conducting HVAC “clean and tunes” required developing a new mindset for this weatherization. Eventually, the implementer found a new HVAC contractor that agreed to work for the current clean-and-tune price for the remainder of 2019 (Reeves et al., 2020).

Program update: In July 2021, DHCD signed new agreements with Local Weatherization Agencies (LWAs) and onboarded five additional providers for MEET. In the fall of 2021, DHCD signed new contracts with SWCs and onboarded nine more additional providers for MEET. The new network partners have completed the training and have started to implement projects in two more utility territories. With the new contracts in place with the SWCs and the MEET program training complete, DHCD projects a continued increase in MEET participation in 2022 statewide (DHCD 2022, p. 8). In July 2021, DHCD signed new agreements with Local Weatherization Agencies (LWAs) and onboarded five additional providers for MEET. In the fall of 2021, DHCD signed new contracts with SWCs and onboarded nine more additional providers for MEET.

The new network partners have completed the training and have started to implement projects in two more utility territories. With the new contracts with the SWCs and the MEET program training complete, DHCD expects a continued increase in MEET participation in the first half of 2022 across the state.

The DHCD staff also streamlined the data entry for the statewide launch. Specifically, staff simplified the data entry system and assigned leads to those contractors who completed the initial weatherization work. This



strategy creates continuity for the contractor and the customer and should ease program recruitment and data entry (Tran & Rockwell 2022).

### Energy Efficiency for Nonprofits Evaluation Results

Initially, the pilot program targeted five to nine buildings in Evergy's service territory. Evergy exceeded this participation goal by serving 16 buildings, some of which were satellite facilities owned by the social service agency. Evergy allocated and spent its budget of \$200,000 in providing the audit services and measure installations and rebates to these program participants.

The participating organizations serve the most vulnerable residents in the Kansas City metropolitan area, including the homeless, unemployed veterans, women and children escaping domestic violence, and those facing issues regarding addiction and joblessness.

Several organizations operate facilities, including traditional homeless shelters, small apartments, and single-family homes, which provide transitional housing to residents. The EENP program's outreach included conducting energy audits and installing direct measures in the traditional shelters and multi-family housing units. The single-family housing units were ineligible to receive the free thermostats.

Participating organizations received new LED lighting for their buildings' interior and exterior portions. A few respondents reported receiving new air conditioning filters, power strips and HVAC tune-ups. Several participants reported receiving insulation and air sealing in the attics and receiving sink and faucet aerators in the facility's bathrooms. One organization also received rebates to install a new HVAC unit in addition to receiving the other direct install measures.

Several participants indicated that the energy audit identified additional areas for future savings, specifically in replacing the aging HVAC equipment. Although the EENP has ended, the energy audit recommendations are still essential to consider going forward (ADM 2022).

### Manufactured Homes Replacement Pilot

This program relies on support from multiple partners to successfully move residents from old, energy-inefficient manufactured homes to newer, more energy-efficient models. However, this process can be long and complicated as it relies on a coordinated approach throughout this process, as Figure 3 illustrates.



Figure 3. Participant journey during the MHRP process *Source: ODC 2020, p.8.*



The key findings from this multi-year process evaluation are summarized next.

- The process evaluation confirmed the general disrepair of existing pre-1994 manufactured homes, including issues related to the foundation, floor, roof, walls, plumbing, and HVAC systems. Mold, pests and air and water leaks were also common.
- Participants worried about paying their rent and utility bills and faced evictions or shutoffs. Many participants were uncomfortable in their homes and concerned that they would burn down due to electrical issues and poor wiring. Qualitatively, many participants also described new health conditions or worsened prior health conditions due to problematic home conditions.
- Most program participants were excited to learn about the pilot, though several were unsure or skeptical if the opportunity was a good fit for them. Low-income households tend to be conservative with new financial endeavors and are cautious about taking on new debt; for these reasons, some lose interest after learning more about the financial commitment.
- Oregon Housing and Community Services (OHCS) weatherization funds funneled through Community Action Agencies are a significant subsidy that reduces the amount of money the homeowner will need to borrow on loan but are limited in their availability. Currently, each CAP agency chooses whether they will request permission to allocate weatherization funds to a manufactured home replacement, and one has agreed to support the Pilot. This process creates additional work for pilot staff to engage each agency and limits these funds' availability for participants.
- Project costs can vary and are hard to predict but range between \$75,000 to \$123,000 for single-wide replacements. Other fees such as asbestos removal and site preparation can incur additional costs. Estimating project costs increase the difficulty for a participant to convey to a lender what they need to borrow.
- Newer manufactured homes may not always fit on the existing property, making it challenging to comply with setback requirements when siting home in the same lot.
- Participants also receive non-energy benefits after moving from a pre-1994 manufactured home to a new, efficient one. The most significant differences noted by participants have improved thermal comfort and health improvements (ODC 2020, pp. 1-2).

## Conclusions

These three pilot program evaluations identified some critical and common themes that evaluators and implementers should consider in program designs targeting low- and moderate-income households. These conclusions are summarized next.

### **Process evaluations for pilot programs are an essential “best practice.”**

Each pilot evaluation identified some gaps in program delivery. These gaps could then be fine-tuned and corrected before full implementation for the MEET and MHR programs. The process evaluations also captured important nuances that identified the types of adjustments needed, including:

- Modifying the program marketing approach to provide a more personalized marketing strategy for the MEET program.
- Developing a liability form for MEET contractors significantly improved the number of ‘clean and tunes’ while proactively addressing contractors’ concerns (Reeves et al., 2020).
- Clarifying the roles and responsibilities of the stakeholders involved in developing program offerings for MHR participants (ODC 2020).

- Granting exceptions for nonprofit organizations whose buildings may include a mix of commercial and residential structures in the EENP program (ADM 2022).

### **One size doesn't fit all.**

The most successful program designs merged a proven approach with customized program offerings. The MEET program, for example, successfully combined a behavior-based approach with energy efficiency education and direct measure installation. But participant recruitment and outreach activities had to be tailored to the communities to minimize initial participant reluctance and skepticism.

The MEET program also provides participants custom energy consumption reports based on their current energy usage behaviors. The training reinforces how minor energy usage adjustments will lead to long-term energy savings (Reeves et al., 2020).

The EENP energy audit reports identified each participating organization's most cost-efficient energy upgrades. Each building also received its mix of direct install measures, depending upon building characteristics and energy usage (ADM 2022).

The MHR program required customized program offerings tailored to the exact financing needs of each participant. This high level of customization also increased the staff workload and generated uncertainty regarding the actual program costs and funding plans available. As the process evaluation noted, individualized attention is critical when home replacement projects occur on a case-by-case basis (ODC 2020).

### **The low- and moderate-income community extends beyond residents.**

The EENP pilot program illustrated an effective way to expand the reach and target of traditional low-income programs. This program focused on an often-overlooked segment of the low-income community: those organizations providing housing and social services to vulnerable populations. The program's straightforward approach of combining an energy audit with direct install measures leveraged a proven program design into a new market: nonprofit organizations. These organizations face the same challenges as traditional businesses. However, they tend to have fewer resources available for energy improvements. Combining energy recommendations with higher incentives allows these organizations to maximize energy savings and thus divert resources to support other vital programmatic operations.

- The EENP pilot provides a clear blueprint on how program implementers can expand the reach and benefits of their programs to the broader community.

### **Low and moderate-income programs also yield non-energy benefits.**

These programs also led to non-energy benefits that should be documented in future impact evaluations. The types of non-energy benefits included:

- Longer-term health, comfort and safety for residents who move into energy-efficient new manufactured housing units (ODC 2020).
- The EENP program participants noted that the increased lighting led to better visibility, security, and overall mood improvement among the residents (ADM 2022).

### **Key Takeaways**

Program administrators, designers, and implementers should leverage these innovative program designs into future strategies to better reach under-served communities. As these three pilot programs illustrate, they

led to a host of energy and non-energy benefits that positively impact the residents and the communities where they live.

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