

Overcoming Health and Safety Barriers to Weatherizing Income-Eligible Homes: Lessons Learned from Connecticut

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ABSTRACT

Weatherizing homes is a proven and impactful strategy to save energy and money and improve comfort. Yet, programs and contractors commonly find health and safety barriers (e.g., asbestos, mold, moisture, knob and tube wiring) that preclude moving forward with weatherization work. These barriers are increasingly being recognized as significant hurdles in addressing homes' weatherization needs, particularly affecting low-income households. In fact, Connecticut has documented that over 20% of low-income homes in the pipeline for energy upgrades are deferred due to health and safety issues. While there are many programs to expand home weatherization, strategies to address these barriers are not as well-known, accessible, or widely utilized, blocking progress in weatherizing our existing housing stock.

Our team and others assisted in the design of a program in Connecticut to address health and safety barriers in low-income homes to allow participation in the DOE-funded Weatherization Assistance Program and the utility-funded Home Energy Solutions Income-Eligible Program. The team worked to identify resources to address this problem, including opportunities through the Low-Income Home Energy Assistance Program (LIHEAP), and compiled case studies of other successful state efforts. The paper presents tools and strategies that states, programs, and others can use based on the Connecticut experience to address health and safety barriers in their own states or programs, including information on accessing funding and guidance on program design and elements.

Introduction

Background on Health and Safety Barriers to Weatherization

Weatherization makes homes more energy efficient, saving households energy and money and improving occupant comfort. Yet, programs and contractors commonly find health, safety, structural, and other barriers that preclude moving forward with weatherization work. These barriers to weatherization work are increasingly being recognized as significant hurdles in addressing homes' weatherization needs.

Many barriers to home weatherization are considered health and safety issues. Improving home conditions to remediate moisture, mold, asbestos, poorly venting appliances, and gas leaks, for example, makes homes safer and healthier and clears away the barriers that allow for weatherization services to proceed, resulting in multiple benefits. Therefore, this report will refer to these issues as "health and safety barriers" to weatherization.

Weatherization involves upgrading the energy performance of homes through measures such as air sealing, insulation, window treatments or replacement, duct sealing, and tuning and repairing HVAC and water heating systems. When health, safety, or structural concerns prevent

these upgrades from happening, weatherization work must be deferred. Operating the blower door to perform air-sealing work, for example, should not take place if it has the chance of causing mold or asbestos to be carried into home air. Similarly, heating system upgrades must be put on hold if energy auditors identify potential asbestos-like material on duct work that would be disturbed by the energy work. Or empty walls with knob-and-tube wiring cannot be blown with insulation due to potential fire hazards until replaced.

Common Health and Safety Barriers to Weatherization:

Asbestos and asbestos-like materials (including Vermiculite), electrical issues (knob and tube wiring), failed combustion safety testing, gas leaks, moisture, mold, structural issues (roof repairs or replacement), and ventilation issues.

Figure 1: Callout box of common health and safety barriers to weatherization.

Health and Safety Barriers in Income-Eligible Households

While health and safety barriers to weatherization are a problem across all household income levels, income-eligible homes are disproportionately impacted. For example, 15% of market rate homes in Connecticut were flagged as having health and safety deferral issues in 2019, while the income eligible program documented a 21% deferral rate in that same year and a 30% average deferral rate over 2014 to 2019 (Eversource 2020). Income-eligible households often face a high energy burden, meaning that a greater proportion of their income goes toward paying energy bills. Households that could therefore benefit most from weatherization services are deferred more often.

According to a report published by the National Renewable Energy Laboratory, 10% to 15% of weatherization clients nationwide eligible for the federal Weatherization Assistance Program (WAP) in 2010 were deferred due to health and safety issues (Wilson and Tohn 2011). A more recent survey conducted by the authors shows even higher deferral rates in individual states. The table below shows recently available data on income-eligible weatherization deferral rates in select states.

Table 1. Weatherization deferral rates in income-eligible programs in select states

State	Weatherization Deferral Rate
Connecticut	21% (2019)
Vermont	10% (2020)
Virginia	18% (2018-19)
Washington	30-40% statewide (2021) 40-50% in rural areas (2018)

Sources: Eversource Barrier Report, July 8, 2020. Vermont personal communication with Weatherization Program Administrator, February 2022. Community Housing Partners (CHP) Energy Solutions, *Utilizing Virginia RGGI Revenue to Support Existing Low-Income Energy Efficiency Programs by Addressing Health & Safety Needs of the Weatherization Assistance Program Providers*, 2020. Washington State Energy Program: *Memorandum Re: Rural Housing Rehabilitation Program, Report with Feedback from Rural Community Action and Weatherization Agencies*, March 9, 2018 &

The Problem

While the issue of health and safety barriers to weatherizing income-eligible homes is increasingly being recognized, there is often no process or dedicated funding source to enable a program, organization, or household to complete the necessary repairs at no or little cost to the household. With no or limited funding or assistance available, these households face major impediments to access weatherization work. So, while there may be funding to address weatherization needs through utility programs or the federal Weatherization Assistance Program, this assistance cannot be accessed.

There is often a disconnect between weatherization services and health and safety repair services. Ideally, there would be a system in place to quickly deliver the necessary health and safety repairs so these households can access federal-, state-, or utility-funded income-eligible programs and be routed back to the energy contractor or program to perform the weatherization work. This report examines programs that deliver health and safety repairs in income-eligible homes to enable weatherization and explores key program elements, potential funding sources, and a case study of a program being established in Connecticut.

Designing Effective Solutions

Elements of an Effective Health and Safety Barrier Remediation Program

A health and safety barrier remediation program is necessary to connect households with services to conduct repairs and deliver the household back to an energy contractor to conduct weatherization work. While addressing health and safety barriers is an issue for market-rate and income-eligible homes, a lack of access to capital and a housing stock more in need of repairs elevates the importance of finding solutions for lower-income residents. Moderate- and higher-income residents can take out loans or otherwise pay to remediate health and safety barriers, but lower-income customers need access to programs and funding to address these issues. The program concepts are similar for all customers needing to remediate these barriers, but this paper focuses on the income-eligible population since they are most in need of program support. The graphic below illustrates the simplified process of the health and safety repairs program.

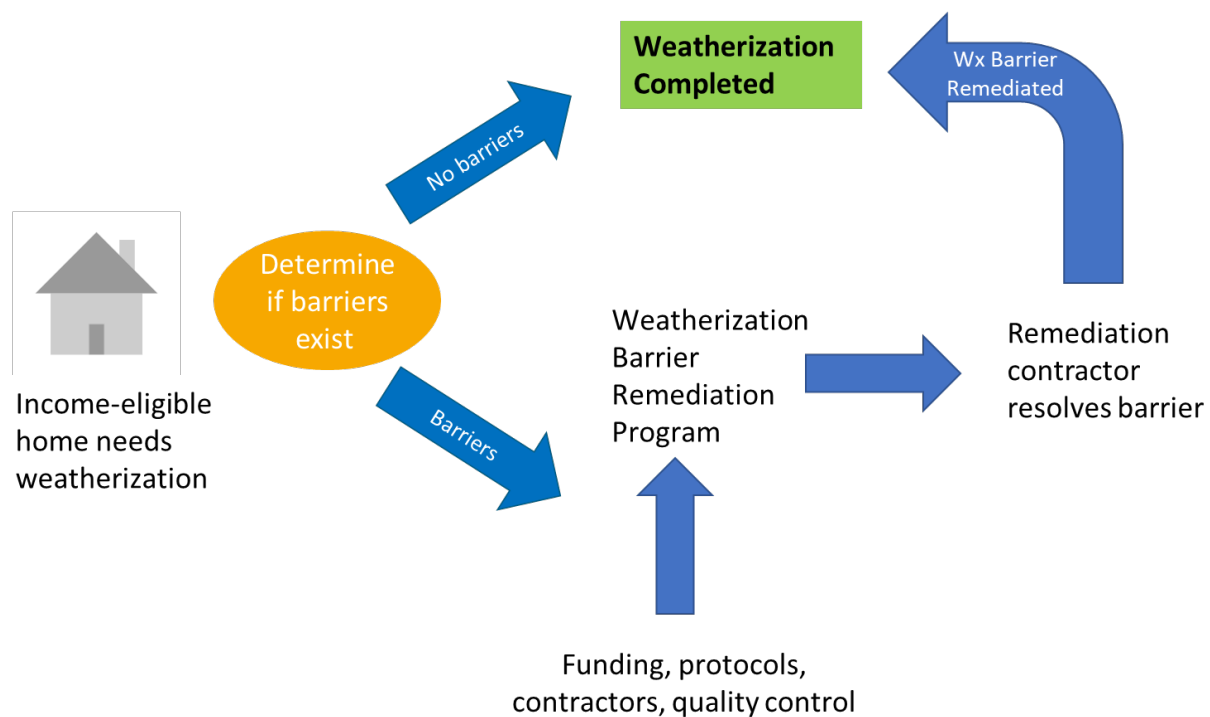


Figure 2. Diagram of an effective weatherization barriers remediation program.

There are a number of key underlying principles that would make a barrier remediation program successful and effective. One major consideration is that the program must be easily accessible to the energy contractors doing the weatherization work who identify the deferral issue. Ideally, these contractors would make the referral to the barrier remediation program or manage the work themselves rather than relying on the household/client to follow up with the program. Second, a successful program would deliver repairs for the most common deferral issues (for example, asbestos and moisture/mold) but also would have flexibility to address more unique conditions. And the program must maintain a transparent process, visible to energy funders, energy program implementers, and customers.

Best practices related to funding would establish clear thresholds for maximum jobs costs but allow the program operator some flexibility to manage individual project costs. Importantly, the program should be designed to rely on a sustainable source of funding to ensure the program will continue in the future. This would also guarantee some certainty of future business for independent remediation subcontractors, allowing them to grow their businesses knowing that there will continue to be work for them generated from the program. Below is a summary of these five key underlying principles.

1. Accessible to weatherization contractors
2. Repairs for common issues, but flexible to address unique circumstances
3. Transparent process
4. Thresholds for average job costs, but some flexibility
5. Sustainable funding

Funding Resources

Overview of Funding Resources

State entities interested in implementing a barriers remediation program could have access to a few sources of federal funding, including the Low-Income Home Energy Assistance Program (LIHEAP), administered by the U.S. Department of Health and Human Services (HHS) and the Weatherization Assistance Program (WAP), administered by the U.S. Department of Energy (DOE). Additionally, in 2021, entities have had access to the American Rescue Plan Act (ARPA) funds.

LIHEAP provides assistance to low-income households in helping pay for their immediate home energy needs. This assistance comes in four program categories: heating and cooling energy costs, bill payment assistance, energy crisis assistance, and weatherization and energy-related home repairs. LIHEAP funds generally have greater flexibility than WAP funds when addressing health and safety barriers to weatherization. This flexibility varies significantly depending on how the state agency administering LIHEAP develops the LIHEAP State Plan. LIHEAP is discussed in further detail below.

The DOE WAP program increases the energy efficiency of low-income households, thereby reducing energy costs, improving comfort, and ensuring health and safety of low-income households (EERE 2022). WAP guidelines allow for only specific health and safety repairs and need to meet specific cost-effectiveness standards, which makes WAP generally less flexible than LIHEAP in addressing barriers funding. As intended by federal legislation, WAP funds are primarily intended to save energy and not necessarily improve housing deficiencies, so their focus is on cost-effective energy improvements.

DOE provides guidance of the limited health and safety repairs that are allowable (U.S. Department of Energy 2021). For example, DOE WAP does not allow its grantees to use funds for a range of conditions including lead abatement, asbestos abatement or removal, radon mitigation, or mold cleanup. It does, however, allow grantees to use funds to complete testing (for example, heating system testing and combustion appliance safety testing) and limited water damage repairs and moisture control when necessary to weatherize the home. Most WAP programs recognize the importance of combustion appliance safety testing for occupant health. Many also follow ASHRAE 62.2 indoor air quality requirements to ensure that homes are properly ventilated when they are weatherized.

In 2022, DOE recognized the need to further and more directly address barriers and allocated \$15 million in Weatherization Readiness Funds. These funds will be allocated to states to support barrier repairs and are a good first step to providing added resources and helping to advance equity. State weatherization plans will need to describe how states plan to use these Readiness Funds (U.S. Department of Energy 2022).

The American Rescue Plan Act of 2021 (ARPA) provided funding for relief from the impacts of the COVID-19 pandemic. ARPA funds also increased LIHEAP budgets. In Connecticut, the governor and the legislature made addressing health and safety barriers a priority use of these funds. Up to \$7,000,000 in supplemental funding from the 2021 ARPA funding is planned to support the Connecticut Health and Safety Barriers to Housing Remediation program over the 2022-2024 time period (State of Connecticut 2021 a). Several other states used ARPA added LIHEAP funds to support health and safety barrier programs including, for example, Pennsylvania, Rhode Island, and Vermont (NASCS 2022). Similar

options for funding a barriers remediation program may arise in the future, depending on state and federal priorities.

State and utility energy efficiency programs are also options to providing funding to a barrier remediation program. In Vermont, state funds raised from a charge on fuels go to help pay for the statewide WAP program and are flexible to allow for covering barrier remediation costs. Massachusetts allocates some of its MassSave budget to the Low-Income Energy Affordability Network (LEAN) coalition of WAP providers to cover health and safety remediation costs.

The Department of Housing and Urban Development (HUD) also provides grant funds to address lead and healthy homes hazards through the Office of Lead Hazard Control and Healthy Homes. These funds can provide resources to state and local governments and nonprofits to repair lead hazards, moisture, mold, radon, pests, and other healthy homes risks, some of which can be deferral issues. HUD has also put forth funding to help align lead and weatherization programs.

The Environmental Protection Agency (EPA) also offers technical assistance and funding to address indoor air issues, some of which can also be deferral issues.

LIHEAP and Weatherization

One category of assistance LIHEAP provides to low-income households is weatherization and energy-related home repairs. There are three criteria that guide weatherization under LIHEAP: the weatherization work must be low-cost, cost-effective, and must be energy-related home repairs that do not include new construction (U.S. Department of Health and Human Services 2016).

States are allowed to allocate up to 15% of their LIHEAP funds to deliver weatherization services, which can include health and safety measures. States can also request a waiver to increase the allocation for weatherization to up to 25% of total LIHEAP funds (Burrin, Christopher and Rahman 2021).

State LIHEAP agencies can decide how much of the LIHEAP funds are designated for each program component. Each state spends different amounts of their LIHEAP funds on weatherization assistance. Approximately 9.65% of total federal LIHEAP funds were used on weatherization assistance benefits in 2015 (U.S. Department of Health and Human Services). States generally have more flexibility using LIHEAP funds to install weatherization measures and address weatherization barriers than WAP funds. The flexibility can vary depending on how the state agency administering LIHEAP develops its annual LIHEAP State plan.

LIHEAP as a Resource for Energy-Related Home Repairs

Within the category of weatherization, home repairs are allowable through LIHEAP as long as they are directly related to enabling energy-related work. For example, 36 states in 2020 allowed for energy-related minor roof repairs in their state LIHEAP plan (Burrin, Christopher and Rahman 2021).

In a survey of the LIHEAP state plans of Northeastern states, we found that the majority of these states included health and safety repairs as eligible measures provided through LIHEAP. For example, Pennsylvania specifies that 20% of the average cost per unit can be used for health and safety costs. Others note that structural repairs and roof repairs are allowable, as long as the repairs enable energy-saving measures, such as attic air-sealing and insulation. Other measures

noted by states include addressing asbestos and vermiculite, mold, and knob and tube wiring. Table 2 summarizes the details of some Northeastern states using LIHEAP for deferral repairs.

While states can allocate 15% of LIHEAP funds to weatherization services, and up to 25% with a waiver, there is no official guidance on what percent of these LIHEAP funds dedicated to weatherization can be used to address health and safety barrier repairs. Yet, due to its relative flexibility and its guidance allowing for repairs which enable energy-related work, LIHEAP looks to be an opportunity for states looking to create a program to overcome barriers to weatherization. As discussed in the next section, the Connecticut Weatherization Barrier Remediation Program is partially funded by LIHEAP.

Table 2. Northeastern states using LIHEAP for deferral repairs

State	Eligible Repairs	Funding Total and Source
Connecticut	Asbestos, vermiculite, moisture & mold, knob/tube, pests, others	\$6.650 MM ARPA, \$5.550 MM ARPA LIHEAP, \$150K State SEP
Massachusetts	Asbestos abatement	LIHEAP
New Hampshire	Roof repairs, require waiver	LIHEAP
New Jersey	Structural repairs, roofs, mold	LIHEAP
New York	Roof repair	LIHEAP
Rhode Island	Knob and Tube Oil tank replacement	\$2MM – ARPA LIHEAP \$1M
Pennsylvania	Deferral issues Clean & tune, preventative maintenance	\$2MM – ARPA LIHEAP & past LIHEAP \$21MM – ARPA LIHEAP
Vermont	Roof repairs, knob and tube	LIHEAP, ARPA, state & private funds

Sources: U.S. Department of Health and Human Services. 2021. LIHEAP Clearinghouse.

<https://liheapch.acf.hhs.gov/stateplans.htm>. NASCSP Data Collection on American Rescue Plan Act Funding: WAP or WAP Related, Provided by NASCSP February 2022.

*Note: Funding totals were not available for all states.

Case Study: Connecticut

Background on Connecticut Health and Safety Deferrals

Many Connecticut residents have encountered health and safety barriers to home weatherization, preventing them from accessing weatherization services in their state's Home Energy Solutions (HES) and Home Energy Solutions-Income Eligible (HES-IE) programs. As in other states, income-eligible households are disproportionately impacted. In fact, Connecticut utilities have documented that over the time period of 2014 to 2019, an average of 14% of

market-rate HES homes and 21% of HES-IE homes are unable to be weatherized work due to a health and safety barrier (Eversource and United Illuminating 2020).

According to data from Connecticut's utilities and the authors' calculations, in 2019 alone, 810 income-eligible households were deferred (Eversource 2020). The most common reasons for deferral were asbestos-like materials (including Vermiculite), mold, and failed combustion safety testing. See Figure 3 for the full list of reasons for deferral.

Mitigating barriers for home weatherization can be expensive and in some cases costs can be prohibitive. According to data collected from the Connecticut Clean Energy Healthy Homes Initiative Projects, a program which ran from 2016 to 2019 and was designed to remediate health and safety barriers, the average cost of a job to remediate the mix of barriers found in participating homes in Connecticut was about \$20,000 (Wilson 2019).

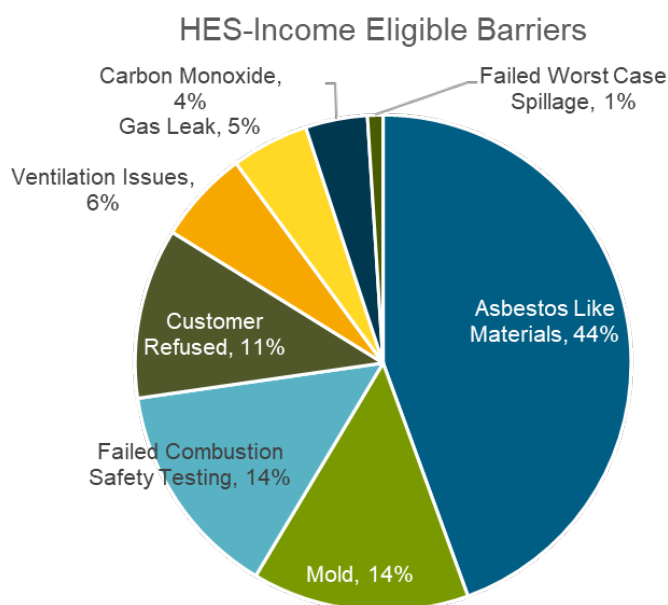


Figure 3. Barriers to income-eligible Home Energy Solutions weatherization services. *Data source:* Eversource Barrier Report, July 8, 2020.

The Connecticut Weatherization Barrier Remediation Program

In 2021, the Connecticut Department of Energy and Environmental Protection (DEEP) released an RFP for a Program Operator of a new Weatherization Barrier Remediation Program. The program will operate from mid-2022 to December 31, 2024, and will be funded through LIHEAP, ARPA funds, and supplemental funding from the U.S. Department of Energy's State Energy Program (SEP).

The purpose of the program is to address health and safety issues that impede the completion of residential weatherization and energy efficiency measures (State of Connecticut 2021 b). The program will remediate barriers in homes that qualify for LIHEAP assistance, and the homes will subsequently be weatherized by the HES-IE Program or the DOE's WAP. The program will address "health and safety issues, including but not limited to asbestos, mold, vermiculite, unsafe appliance combustion, gas leaks, carbon monoxide, structural issues, venting

issues, and knob and tube wiring, that impede the ability to move forward with weatherization measures” (State of Connecticut 2021 b).

The Weatherization Barrier Remediation Program will oversee “(1) establishing the eligibility of customers requesting services from the Program, (2) connecting customers with the appropriate resources to complete the barrier remediation work, (3) inspecting completed barrier remediation work, and (4) confirming that weatherization measures are completed once the barriers are remediated through the HES-IE or WAP” (State of Connecticut 2021 b).

Depending on the funding source, the program aims to remediate between 188 and 228 homes in 2022, the first year of the program. Over the lifetime of the program, the goal is to remediate between 625 and 788 homes, depending on funding source. Projects supported by LIHEAP and ARPA funds have a maximum job cap of \$30,000, and an anticipated average of \$15,000 per job. For jobs only utilizing LIHEAP funds, the cap is \$15,000, and an anticipated average of \$8,000 per job. The report authors plan to continue to stay engaged in the implementation and oversight of the Program in their role working for the Connecticut Energy Efficiency Board.

Process of Developing a Health and Safety Barriers Program in Connecticut

The process of developing a health and safety barriers program in Connecticut began with identifying the problem. Utility program administrators gathered data on deferral rates in their programs and sharing this deferral data with regulators and the Connecticut Energy Efficiency Board (EEB). Advocates raised concerns about how the deferral issue directly impacts equity considerations. Advocates and members of the EEB then elevated and promoted the issue at the state level. The Connecticut Department of Energy and Environmental Protection (DEEP) recognized the issue and sponsored two stakeholder meetings in late 2020 and early 2021 with presentations, program models in other states, and program needs.

As part of this process, DEEP identified LIHEAP as an eligible funding source to address deferrals. DEEP and advocates then engaged with the Connecticut LIHEAP Board to understand how LIHEAP funds can be used to remediate health and safety barriers. DEEP presented information to the LIHEAP Board on the need and potential program design elements. In addition to the LIHEAP funding, the Governor and the state legislature acted in alignment in March of 2021 to allocate \$7,000,000 in ARPA funds to address barriers.

In addition to the two stakeholder workshops, DEEP held a public input session on the potential barriers remediation program before issuing a draft Request for Proposals (RFP) and accepted public comments to the draft RFP before the final RFP was released. DEEP then issued the RFP For Statewide Weatherization Barrier Remediation Program Operator in November of 2021.

Lessons Learned from Connecticut

The authors have compiled lessons learned from the process of providing input and support in the development of the Connecticut program. A key to constructing a health and safety barriers program is making a strong case for the need for this program. This involves collecting data and using the data to demonstrate to key decision makers, funders, utilities, and program managers who is missing out on program participation. In particular, it is important to track the types of deferrals in order to be able to structure the response and identify the types of remediation contractors that will be needed. Part of making the case is emphasizing the equity

issue implications, highlighting that those who most need the program are likely being denied weatherization services.

Another key lesson learned is the importance of engaging stakeholders. It is important to provide forums to share data, solicit information from contractors and programs, hear from advocates, and build the argument for a program and funding. For example, stakeholders could include state agencies, utilities, environmental and equity advocates, and others. A large coalition of interested players helps build momentum.

In addition, enlisting the support of key decisionmakers will help move the process of establishing the program forward. Educate and support people in power including, for example, state agencies overseeing energy efficiency, housing, or social services overseeing fuel assistance. Support allies on state legislative committees and in the legislature. Ensure that utilities are supportive of the efforts and see this program as a way to meet their goals. And if possible, engage those in high places, including for example, the Governor's office.

It is also important to find support and allies within state government and utilities. Federal funds most easily flow through existing government channels. Redirecting funds is likely easier than trying to create a new channel to fund a barriers program. For example, it is vital to engage with the LIHEAP decision making board and agency overseeing LIHEAP. This is a chance to encourage greater opportunities for public input into and transparency of LIHEAP board decision making.

Another lesson learned is to make an effort to understand the interests of key agency and utility staff in order to create solutions that address deferrals and advance their goals and interests. Provide these agency and utility staff the information and tools to help solve the problem and advance their interests. Be upfront and clear that deferral solutions advance equity within the energy programs and services. For example, equity was an important driver for the Connecticut state agencies.

Be sure to coordinate closely with the utility program administrators. Utility program administrators can facilitate a seamless customer experience that addresses the health and safety barrier and hands homes from the remediation contractor back to the weatherization program, which is a key to success. It is important to link coordination between utility and WAP funding. Making LIHEAP funds available in Connecticut to both the utilities and to Community Action Agencies, which administer WAP, allowed the utilities to be recipients of the funds.

These funds will allow the hundreds of homes that have been barriered for years to participate in the utilities' Home Energy Solutions-Income Eligible program and WAP program. Over the lifetime of the program, the goal is to remediate between 625 and 788 homes, depending on funding source. The utilities' market-based contractors will be able to reach back out to homes that were never able to receive the services normally provided to non-barriered homes, including direct-install air-sealing, duct sealing, water savings measures, LED lighting, smart-strips and an audit with offers of cost subsidies for insulation, windows, water heating and space heating equipment. Allowing these projects to proceed not only benefits the low-income customers who were denied the energy savings services due to the weatherization barriers, but also will provide an economic boost to the barrier remediation contractors, the weatherization contractors, and the Community Action Agency contractors.

Funding for a health and safety barriers program can come from a variety of sources, including federal, state, and utility programs. For example, several states used American Rescue Plan Act of 2021 (ARPA) added LIHEAP funds to support health and safety barrier programs. Similar options for funding a barriers remediation program may arise in the future, depending on

state and federal priorities. State and utility energy efficiency programs are also options to providing funding to a barrier remediation program.

Lastly, this is an opportunity to reframe what is possible, even if it is a new approach. Make the case that investment in addressing deferrals- thereby getting more energy jobs done- will over time reduce demand for LIHEAP as households have lower energy usage, ultimately freeing up funds for more clients to use the LIHEAP funds in the future. In addition to stretched WAP and LIHEAP funds, states and advocates will be key players in identifying other funding to address housing deficiencies and health and safety issues.

Conclusion

Health and safety barriers to home weatherization are a prevalent issue that precludes energy work in homes, preventing energy savings and health and comfort improvements for residents. This issue disproportionately impacts income-eligible households, who tend to be the households who benefit most from weatherization work. A program to connect households with home repair contractors and to fund the work, and then to hand these homes back to energy contractors to complete weatherization work, would enable states to overcome this issue. LIHEAP, among other sources, is an available source of funding for such a program. Connecticut established a Statewide Weatherization Barrier Remediation Program, proof that states and others can focus resources to set up a system to ensure that all households receive weatherization services. Others looking to set up a health and safety barriers program can see this as an opportunity to reframe what is possible in order to improve access to home weatherization services.

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