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Engaging Residents from Affordable Housing Properties in Building Code Development

Prepared by:
Claire Lee
Keyla Palala
Darlene Yule

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Legal Disclaimer

Preface

This report was created through the Climate Resilient Energy Codes for Multifamily Affordable Housing project, a Department of Energy funded initiative under the Resilient and Efficient Code Implementation program. The Climate Resilient Energy Codes project is designed to enable greater deployment of climate resilient energy systems, including solar power, battery storage, and efficient heating and cooling, to maintain living conditions and essential services for multifamily affordable housing residents sheltering in place during grid outages. The project is a three-year effort by an integrated team led by Clean Energy Group, in partnership with American Microgrid Solutions, the Connecticut Department of Energy & Environmental Protection, the Connecticut Green Bank, the Connecticut Insurance Department, New Buildings Institute, Operation Fuel, and the Yale Center on Climate Change and Health. The work is being guided and informed by an Affordable Housing Advisory Group and a Technical Advisory Group consisting of affordable housing and energy sector stakeholders and representatives, alongside Connecticut residents from affordable housing properties, who provided feedback on the proposed measures. Operation Fuel led the feedback portion of this project by organizing listening sessions and individual interviews for residents and employees of affordable housing properties, held in both English and Spanish.

Background

Climate change has exacerbated the frequency and intensity of extreme weather events, often resulting in power outages and costly damages to energy infrastructure nationwide. The effects of an ever-changing climate in Connecticut are evidenced by the recent flooding of the Naugatuck River Valley and Hurricane Isaias in 2021. These are two of many climate-driven events that have caused widespread devastation in recent years, and will continue to do so, without adequate protective measures. This project aims to develop, establish, and advance the implementation of a Climate Resilient Energy (CRE) code for multifamily affordable housing, an unprecedented step for incorporating resilient energy systems in existing building code frameworks. The stretch code establishes standards for these properties to enhance energy efficiency and their structural ability to withstand extreme weather while reducing their carbon footprint through sustainable energy pathways. Moreover, the code will help to address some of the most pressing concerns for residents living in affordable housing by alleviating the challenges associated with energy poverty and insecurity. Reinforcing properties' energy and climate resilience also serves as a safety net for especially vulnerable populations during outages, such as individuals reliant on electricity for medical needs.

The project team recognizes the importance of including diverse perspectives of relevant stakeholders in developing innovative building codes. Residents play an essential role in this process by providing firsthand feedback to ensure that the impacted populations will adequately and equitably benefit from the code. The integration of resident input into code development is thus critical to formulating well-informed building code standards that will align with residents' needs and address their concerns. For this project, Operation Fuel led a targeted outreach and recruitment campaign and coordinated in-person listening and interview sessions for residents living in and employees of affordable housing properties. The objectives of these meetings were twofold: to empower residents to engage with and shape decision-making around climate resilient energy code; to provide education about the project's purpose and the benefits of home energy efficiency. The data from the project's first feedback phase was synthesized into a series of takeaways and recommendations to be discussed in this report.

Methodology

Outreach and Recruitment

We directly contacted resident service coordinators (RSCs), and other housing professionals who oversee resident engagement, to discuss the goals and logistics of listening sessions. Throughout the outreach process, we revised our communications template to ensure we effectively conveyed the project's objectives and purpose to these individuals. To maximize our recruitment efforts, we created flyers for the staff to distribute internally among residents and employees. Registrations were documented using a digital form to determine eligibility and gain consent for recording before the listening session date.

Participants were compensated for their time and input with a $50 gift card at the end of the session. Community rooms of affordable housing complexes were ideal hosting sites for these sessions, as they are centrally located and thus easily accessible for prospective participants to share their input. The team also recognized the importance of diversifying our feedback by including perspectives unique to rural communities. However, we encountered some challenges with reaching rural populations, which barred their participation in this round. We plan to reassess our outreach strategy for the next round of feedback to facilitate more inclusive participation. The team also attempted to connect with housing staff, such as property managers and developers, to gather their perspectives from a technical standpoint through individual interviews. Overall, we faced scheduling difficulties with staff members and ultimately decided to prioritize residents' input. However, we were able to hold one virtual interview with the resident service coordinator (RSC) from Shad Run Terrace to supplement the resident feedback.

For this round of feedback, we engaged a total of 80 residents, including the RSC. Eight listening sessions were held in person at the community rooms of the following sites, largely situated in urban and suburban areas of Connecticut:

Figure 1: Multifamily Affordable Housing Locations and Participant Numbers

Multifamily Affordable Housing Locations	Participants per Location
Cheshire	12
Hartford	10
Manchester	11
New Britain	5
New Haven	27
Windsor	15

Data Collection and Analysis

We gathered feedback from multifamily affordable housing residents across Connecticut through a multilateral process. Our listening sessions were structured as informal focus groups or town hall-style meetings, consisting of a PowerPoint presentation to accomplish the following: first, to inform tenants about the importance of energy efficiency in housing and their role in providing feedback; second, to explain each of the proposed building code measures by utilizing three major condensed concepts (Figure 2: Code Concepts and Definitions). Working with the New Buildings Institute's marketing team, we translated the draft measures into non-technical language to ensure the information was more easily presented and comprehensible for session participants. Additionally, we developed a script for the presentation, accompanied by a series of potential discussion questions to facilitate the pace of discussion.

Figure 2: Code Concepts and Definitions

Code Concept	Concept Definition
Section 1: Building Envelope and Passive Strategies	Improve the buildings' exterior barrier and use strategies that provide long-term, protective benefits, such as air sealing and insulation, for improved energy efficiency.
Section 2: Building Systems and Smart Technology	Using the latest technologies to create a long-lasting and efficient energy system for the building, which also improves residents' energy usage.
Section 3: Resilience and Emergency Power Systems	Improve buildings' ability to withstand extreme weather and reliably provide power during uncertainty to ensure that they are operational, livable, and safe in emergencies.

Our team recognized that many of these sites had a significant Spanish-speaking population that could provide useful insights. To overcome the language barrier in participation we utilized translation services to diversify the feedback. We held a separate listening session in Spanish in Manchester to accommodate the residential area's predominantly bilingual population and provide an equitable opportunity for input to be incorporated into the code development process.

After each session, a team member listened to the recorded audio and took notes on residents' feedback, for each proposed measure, corresponding to one of the three major concepts of the code. A note template was created to maintain a consistent format for organizing this data. Throughout this process, notable quotes were also drawn out and recorded to help contextualize the feedback provided. Following notetaking completion, the note-taker began the analysis process. We identified recurring, overarching themes and patterns throughout our notes and compiled them into a minimum of two key takeaways for each session. The corresponding takeaways for every session have been organized into a table (Figure 3) to formulate considerations and recommendations for code development and future outreach.

Key Takeaways

Each discussion was recorded and analyzed to identify key takeaways for informing future recommendations. The following table (Figure 3) summarizes these findings for each listening session and interview held during the project's initial phase.

Figure 3: Listening Session Key Takeaways

Listening Session	Key Takeaways
Session #1: Hartford	1. Residents appear to be receptive and open to implementing these codes in their communities (in an ideal world, excluding the costs of these measures). 2. Many expressed skepticism about actual change being made in their communities due to the nature of affordable housing. As a result, they find it challenging to realistically envision positive, tangible developments that could enhance the buildings' energy resilience. 3. It was necessary to remind participants to consider the proposed measures without focusing on the financial aspects. The reluctance of some residents to engage in discussions seems to stem from concerns that such initiatives in affordable housing communities would lead to increased rent or costs incurred by the tenants.
Session #2: Manchester	1. Tenants expressed mixed feedback on measures that involved smart technologies. While they acknowledged the benefits it could create, they expressed fears about overall unfamiliarity, potential malfunctioning, and unreliability of technology at times. 2. Additions and adjustments to the existing building envelope should be feasible, given the building's current structure and capabilities. This is pertinent to measures related to roofs, windows, and backup/emergency circuiting. 3. Effective implementation of procedures during emergencies should prioritize vulnerable populations, such as those with disabilities and the elderly, and building management should be transparent with tenants about these plans (i.e., communicate this information to those affected).
Session #3: New Haven	1. Tenants raised concerns about the composition and maintenance of the building's roof, which has had leaks and water damage. 2. Tenants shared experiences with overheating and the need for effective shading and insulation. 3. There was a call for more flexible regulations that can adapt to future technological advancements and the changing needs of residents. This should include involving diverse stakeholders, including people with disabilities, in the process of writing regulations.

Session #4: New Haven	1. Tenants frequently expressed concerns with the cost of implementation, installation, and maintenance of the proposed measures (alternative backup power sources, smart devices/controls to name a few). From a tenant's perspective, the project's feasibility is intertwined with cost. 2. Backup power is paramount during emergencies, and vulnerable individuals should be prioritized in these situations. 3. Participants expressed diverse perspectives toward the proposed measures' impact on different individuals, based on needs, budget, and location-specific issues, to name a few. For example, some pointed out the need to mitigate window drafts, while others were more concerned about soundproofing the building envelope.
Session #5: Manchester (Spanish)	1. Overall, the residents were engaged with the proposal and expressed concerns about the costs of implementation and maintenance, and whether these costs would be distributed evenly. We reminded residents to not think about potential costs while providing feedback, as this factor would influence their input. 2. Questions arose about where the construction would begin and how it would impact the living conditions of future residents, with the response that it should likely be carried out with minimal disruption (noise, potential damage, interruptions to existing operative systems, etc.). 3. Recurring issues at this site include issues with current water quality in the area (residents were told that a filtration system, to provide clean potable water, would be installed in new housing), fuses in refrigerators, and poor air quality, which could be alleviated through the proposed measures.
Session #6: Windsor	1. Residents are experiencing significant issues with the building envelope, including roof leaks, poor insulation, drafty windows, and moisture/mold problems. Addressing these problems through improved air sealing, insulation, and window replacements is a high priority. 2. Residents are interested in more energy-efficient roofing options; to better withstand the local climate and reduce energy costs. 3. There is a need for better ventilation and humidity control in the units to address air quality and health concerns related to the current issues. 4. Residents would like to see improvements to the community's emergency preparedness, including backup power sources, community rooms for sheltering in place, and better communication from management during outages.

Session #6: Windsor (Cont'd)	5. The overall feedback highlights the need for a comprehensive approach to improving the building envelope, mechanical systems, and emergency preparedness to enhance the energy efficiency, comfort, and resilience of the affordable housing community.
Session #7: New Britain	1. Participants expressed significant dissatisfaction with the current state of their building envelope. Many cited issues with functionality, air and sound leaks, and safety concerns. There was a desire for more resident-operated and energy-efficient windows that could provide better temperature control and ventilation. 2. Participants shared experiences of power outages, both weather-related and due to other causes, and they expressed anxiety about being unprepared for extended losses of power. There were concerns about the impact of power outages on medical equipment and the ability to shelter in place comfortably. 3. Participants were interested in measures that could help reduce their energy costs, as energy bills are a significant burden. There was uncertainty about how potential changes to the rent structure (energy costs billed separately, rather than included in rent) would acclimate to these proposed measures.
Session #8: Cheshire	1. Consider how these measures may impact units that vary in how their heating/cooling systems are positioned. One resident shared his personal experience with his baseboard on the ceiling, which resulted in an undesirably cooler room and inefficient energy utilization while having to bear the burden of high energy bill costs. 2. Dust accumulation, excessive humidity, mold, and concerns with roof performance and occupant health were commonly cited issues at this location. Measures to improve the building envelope, specifically targeting ventilation, air sealing, roof materials, and windows, would be beneficial for addressing these problems. 3. While residents commended this site's emergency preparedness procedures, they suggested that proper communication and the prioritization of vulnerable populations, such as the elderly, children, and individuals with disabilities and other medical needs, are essential to effective code implementation elsewhere. 4. Smart technologies would generally help to improve efficiency and convenience for residents' energy usage.

Interview #1: RSC from Windsor	1. Measures that align with what residents want must be safe and help with energy usage; cost to the residents is typically of concern. 2. All building envelope measures would be beneficial to improve the existing structure. 3. New technologies, such as smart devices and controls and EV charging, may not be as well received. Many residents face difficulty using their smartphones and EV charging would be beneficial as a long-term goal but may not be practical now due to lack of EV ownership. 4. RSC said she would like to see more preparation being done to better equip the residents during emergencies. Community rooms and clean drinking water are essential measures for emergency preparedness.

The team compiled a list of considerations for further code development, drawing from these key takeaways:

1. **Who is ultimately responsible for carrying out these measures (Figure 4)?** Clarifying this to residents during the next round of feedback could shift the types of responses we receive about the measures.
2. **How can these measures help tenants residing in affordable housing become confident to use any unfamiliar technologies involved?**
    a. **How much interaction will tenants have with these technologies?** Not all technology measures included in the building codes will be implemented at the individual unit level and, therefore, will not require education for and adoption by tenants.
3. **How can we make these measures more inclusive, taking residents' feedback into account?** The measures should be drafted to prioritize improvements and recommendations in the context of tenants' various needs, abilities, and circumstances.

Figure 4: Code Concepts and Corresponding Measures

Code Concept	Concept Definition	Example Measures
Section 1: Building Envelope and Passive Strategies	Improve the building's exterior barrier and use strategies that provide long-term, protective benefits, such as air sealing and insulation, for improved energy efficiency.	• Roofs • Windows • Building Air Sealing
Section 2: Building Systems and Smart Technology	Using the latest technologies to create a long-lasting and efficient energy system for the building, which also improves residents' energy usage.	• Microgrids • Reduced Consumption of Electricity • EV Charging
Section 3: Resilience and Emergency Power Systems	Improve buildings' ability to withstand extreme weather and reliably provide power during uncertainty to ensure that they are operational, livable, and safe in emergencies.	• Community Spaces • Emergency Preparedness • Water

Recommendations

Resident Engagement and Transparency

> "Everything that we're discussing here, in structure and envelope, is the product of my building right now. It's under city investigation ... everything we're talking about here is what I'm going through in that building."
>
> - New Britain Participant

Efforts to amplify residents' voiced concerns and increase transparency are central to effective code implementation. Residents often mentioned a lack of transparency and communication of plans from management, which can lead to distrust and misinformation. We suggest the following to facilitate residents' engagement with the code's measures and purpose to stay informed:

1. **Communication:** Develop a clear and transparent communication strategy to keep residents informed about proposed measures, implementation timelines, and emergency procedures. Providing regular updates through community meetings can help build trust and engagement.
2. **Cost Management:** Work on creating a cost-sharing model or securing funding from grants, government programs, or private partnerships to eliminate any potential financial burden on tenants. Share the data around energy efficiency gains in a consumable manner.

Energy Efficiency and Occupant Comfort

> "They [were] supposed to remodel the inside units, especially the ones from the 70s..."
>
> - Windsor Participant

At every affordable housing site that provided feedback, residents mentioned the need for some kind of improvement to the existing building envelope. The code should ensure that these improvements can be made promptly, and within a realistic timeframe, as many residents mentioned delayed or prolonged installations and repairs as a recurring problem. We recommend the following priorities for enhancing occupant comfort and energy efficiency:

1. **Building Envelope Improvements:** Prioritize improvements to the building envelope, such as repairing roof leaks, enhancing insulation, and replacing drafty windows, to mitigate poor insulation and moisture/mold problems.
2. **Ventilation and Humidity Control:** Invest in better ventilation systems and humidity control measures to improve indoor air quality to alleviate health concerns.
3. **Energy-Efficient Roofing:** Explore other energy-efficient roofing options that can better withstand local climate conditions and reduce energy costs for residents.

Implementation of Smart Technologies

Many residents and the RSC we interviewed shared that some individuals are unfamiliar with newer technologies and may have difficulty using smart controls and devices to optimize their energy usage. Although smart energy technologies seemed appealing to many, participants expressed concerns about the potentially high cost of supplying these devices to residents, as well as the additional costs of ensuring that these technologies work properly.

"You're [going to] have a hard time with the population here because so many people can't even use a cellphone."

- New Haven Participant

"... I feel like it would be easier just due to the fact that you're always on your phone."

- Manchester Participant

To ensure that residents are effectively utilizing technology to enhance energy efficiency in their homes, we suggest the following:

1. **Education and Support:** Housing management should offer training sessions and support to help residents acclimate to new smart technologies, ensuring they understand the benefits and how to use them effectively. Residents with technological familiarity should also be encouraged to attend these sessions to facilitate peer-to-peer support.
2. **Reliability and Maintenance:** Establish a reliable maintenance plan, which may include a facility-wide schedule and implementation timeline, and support system for smart technologies to address residents' concerns about potential malfunctions. Management should regularly communicate with the residents about these procedures and plans.

Emergency Preparedness

"A lot of us can't even go down one flight ... most of us have disabilities of one kind or another."

- New Haven Participant

Tenants were receptive to the measures that addressed emergency preparedness and backup power sources. They emphasized the protection of vulnerable populations, such as the elderly and individuals with disabilities, during emergencies like a power outage. Many residents highlighted the importance of ensuring that any development of a new plan, or changes made to an existing plan, are clearly communicated to the tenants. In addition to building envelope improvements, there was consensus across the board that resources, such as common spaces, potable water, and backup power, would be beneficial to residents, if they are adequately equipped and maintained for emergencies.

1. **Backup Power Sources:** Prioritize the installation and proper functioning of backup power sources, especially for vulnerable populations such as those with disabilities and the elderly, to ensure their safety during emergencies.

2. **Community Sheltering:** Develop community rooms supplied through backup power systems for sheltering in place during emergencies and ensure they are equipped with necessary resources.
3. **Emergency Plans:** Communicate and regularly update emergency preparedness plans, ensuring all residents are aware and can access the necessary information.

Feasibility and Adaptability

Across all listening sessions and interviews, cost was a recurring concern raised by the residents and RSC. Residents expressed concerns about the potential financial burden associated with installation, maintenance, and improvements to existing building features. As a result, there appeared to be some skepticism about the feasibility of these measures to produce tangible outcomes in their communities. Participants also shared concerns about the adaptability of the proposed measures to the existing building infrastructure, which varies by site. On the other hand, it is important to note that high costs may deter building management from adopting the code's measures, despite the long and short-term benefits of energy efficiency. We suggest the following to improve the feasibility and adaptability of these measures:

> **"Changes will not be implemented in affordable housing because then it will no longer be affordable."**
>
> **- Hartford Participant**

1. **Pilot Programs:** Implement pilot programs to test the feasibility of proposed measures before full-scale implementation, allowing for adjustments based on resident feedback and site-specific, practical considerations.
2. **Funding and Partnerships:** Seek partnerships with local organizations, government agencies, and private entities to secure funding and resources for the proposed measures.
3. **Inclusive Planning:** Continue to engage diverse stakeholders, including people with disabilities, in the process of writing and implementing regulations to ensure their needs are considered and addressed.

Long-Term Planning

We emphasized the application of residents' feedback and ideas to future generations of tenants who will be impacted by the code during our listening sessions. We anticipate that some measures, such as EV Charging, may benefit future tenants, despite there being minimal need for it in the present. It is crucial to look ahead and factor in future developments at a given site to accommodate the future needs of building management and the tenants.

1. **Comprehensive Approach:** Adopt a comprehensive approach to improving the building envelope, mechanical systems, and emergency preparedness to enhance the overall energy efficiency, comfort, and resilience of the affordable housing community.
2. **Future-Proofing:** Plan for the long-term by incorporating future-proofing strategies that anticipate and adapt to technological advancements and changing needs.
3. **Flexible Measures:** Advocate for more flexible measures that can better adapt to future technological advancements and evolving resident needs.

Conclusion

In summary, the Climate Resilient Energy (CRE) code development project represents a critical step toward enhancing the energy efficiency, safety, and resilience of multifamily affordable housing properties. By incorporating the feedback of residents, especially members of vulnerable communities, as a key component of this project, this initiative seeks to address pressing issues like energy poverty, poor building infrastructure, and preparedness for climate-driven emergencies.

Key recommendations from this phase highlight the importance of prioritizing improvements to building envelopes, ensuring transparency in communication with residents, and fostering education around optimizing energy usage through smart technology. The emphasis on emergency preparedness in our feedback underscores the need to safeguard the well-being of individuals during unexpected power outages caused by extreme weather events.

Looking ahead, the project aims to balance cost concerns with the long-term benefits of energy efficiency and resilience, while also fostering inclusive and adaptable strategies to meet the diverse needs of residents. By building on these insights, the CRE code has the potential to not only transform affordable housing in Connecticut but also set a precedent for equitable and sustainable energy practices nationwide. In the next phase of this project, we will continue the feedback solicitation process for a revised version of the codes through a second round of listening sessions. These revisions are to be incorporated after accounting for the feedback gathered from the first phase. Furthermore, we plan to supplement our presentation with projected outcomes, developed by our technical team, to thoroughly convey the real-world outcomes and benefits of code implementation to residents.