

Designing an Equitable Electrification Program for Small Rental Properties: A Tale from Several Climates

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ABSTRACT

Unsubsidized residential properties that house families with low and moderate incomes (aka Naturally Occurring Affordable Housing or “NOAH”) are largely left out of current energy efficiency and electrification programs. And yet this type of housing serves 80% of low-income renters nationwide. Preserving unsubsidized affordable housing is critical for housing stability, and electrification of this type of housing is necessary to our carbon reduction imperative. So why is this housing not being served? How can we design and implement effective electrification programs that deliver material benefits to low-income residents and the broader community?

Elevate and New Ecology both design and deliver unsubsidized affordable housing electrification programs in several municipalities in significantly different climate zones. In each case, we seek to deliver electrification as one crucial component within broader multi-pronged strategies for housing stability and reinvestment, climate resiliency, and racial equity. This paper highlights different program design approaches and program parameters taken in on-the-ground programs in the Mid-Atlantic, Midwest, and Pacific Northwest to engage NOAH owners in upgrade programs. This paper also illustrates the use of new Federal investments to complete deeper energy efficiency upgrades and electrification programs in unsubsidized affordable housing.

Introduction

Unsubsidized affordable rental housing (Naturally Occurring Affordable Housing or “NOAH”) has often been left out of energy efficiency and electrification programs - utility, governmental, and privately funded programs alike-because it can be hard to identify, difficult to engage, and requires significant technical assistance support to complete upgrades. While barriers exist that make this sector somewhat more difficult to serve, the industry must design specific efficiency and electrification programs for unsubsidized affordable rentals to realize our housing stability, carbon reduction, climate resiliency, and equity imperatives. Elevate, New Ecology, and several community-based partners have launched programs around the United States that include weatherization, electrification, and clean energy upgrades to improve this important sector of affordable housing. This paper defines the market need, shares case studies of three specific NOAH-serving programs, lessons learned during the first few years of program deployment, and considerations for future electrification program design and funding.

What is Unsubsidized Affordable Housing?

A single definition of unsubsidized affordable housing is not well-established and can vary by location and program. One shared attribute between programs is that, by definition, unsubsidized affordable housing is not supported by state tax credit programs or through Federal operating subsidies administered by the United States Department of Housing and Urban Development (HUD). Since they are not supported through state tax credits or other subsidies,

these homes are not rent-restricted and are more readily identifiable by resident income levels, rents levied, or sales prices in the case of owner-occupied homes. Even though HUD defines low income as at or below 80% of area median income, some programmatic definitions for upper levels of incomes for residents living in unsubsidized affordable housing can range up to 120% AMI, including what is sometimes referred to as workforce housing. Because of this variability by program, a working definition of income levels for residents living in unsubsidized housing should be established by geography and the current housing environment to be inclusive of the greatest number of units in need as well as to be responsive to the local housing market (i.e., gentrification versus community stabilization).

Other attributes that define unsubsidized affordable housing include the number of units in a building, rental versus owner occupied, and rent charged based on unit size. According to a dataset developed by CoStar, most unsubsidized affordable housing consists of multifamily buildings (UII 2016). Yet in the Mid-Atlantic region including Philadelphia PA, Baltimore MD, and Wilmington DE, up to 65% of the unsubsidized affordable housing are single-family attached row homes. Therefore, unsubsidized affordable housing typologies should not be considered static from location to location and the definition of unsubsidized affordable housing should remain flexible based on the local housing typology and needs of the community as evidenced by the completion of a landscape analysis of local housing stock and occupants.

For the programs discussed herein, unsubsidized affordable housing is considered affordable to residents who are at or below 80% AMI, which aligns with the HUD definition of low income and typically have the resources to pay no more than 30% of their income on housing and utilities. Because income information is difficult to access, Elevate and New Ecology aim to design programs where local fair market rents and home sale levels are used as a proxy for eligibility combined with a geographic review of building location using income levels from the American Community Survey (ACS) data tracked by census block (Elevate 2021). Two of the three programs discussed in this paper use this eligibility approach while the Oregon program requires tenant income verification. The Wisconsin and Oregon programs exclusively serve renter-occupied multifamily properties whereas the Delaware program includes single-family homes that are renter or owner-occupied. These working definitions were established through local landscape analyses that included a review of available housing data, interviews with key stakeholders, and building assessments.

Market Scale & Geographic Particularity

Nationally, the unsubsidized affordable housing sector represents 30% of the total available housing stock and 88% of the available affordable housing stock (Elevate 2022). These percentages are similar in Dane County, Wisconsin where 67% of the affordable housing stock in the county is unsubsidized. In Mid-Atlantic cities including Philadelphia, Pennsylvania, Baltimore, Maryland, and Wilmington, Delaware, this rate ranges from 78% to 91% (Elevate 2022). In Oregon, a full 85% of the affordable housing stock is unsubsidized and in King and Pierce Counties, Washington, unsubsidized affordable housing accounts for 70% of the affordable housing stock (Elevate 2023).

A common issue in this housing stock across geographies is a lack of capital investments resulting in deferred maintenance and poor housing quality. Poor housing quality is clearly an issue for the health and safety of current residents, and it introduces the potential for obsolescence impacting housing availability for future low and moderate-income (LMI) households. That said, local markets can have stark differences. In Dane County, Wisconsin and

the Pacific Northwest, for example, a pressing need exists to preserve affordability amid a rising real estate market and a lack of affordable housing. The West Coast has a significant and well-documented affordable housing shortage; California needs 1,450,924 additional units of affordable housing, Oregon lacks nearly 140,000 homes, and Washington lacks more than 220,000 units, in each case available to people with incomes equal to or less than 50% AMI (NLIHC Gap Report, 2022). We cannot build ourselves out of this crisis, especially with new construction of affordable units costing over \$250,000 per unit, and it is paramount that we preserve all existing affordable units (Janover 2024). In contrast, the Wilmington Delaware neighborhood doesn't lack units but instead needs housing upgrades to reverse decades of disinvestment and attract residents by revitalizing neighborhoods and investing in housing.

Why is Unsubsidized Affordable Housing Important?

Elevate's analysis of ACS data shows the number of unsubsidized affordable housing to be over 19 million units nationally (Elevate 2022). The sheer number of units represents a significant contribution to the US affordable housing stock and should be the focus of future upgrades and clean energy investments as one strategy to preserve affordable housing and meet Federal, state, and local climate goals.

Investment in unsubsidized properties, including efficiency and electrification upgrades, will help maintain quality affordable homes (Divringi, E. et.al 2016). Not only can upgrades save the residents money and make their homes more comfortable, but efficiency and electrification investments may also reduce operating costs for the owner and improve the quality of the asset. Upfront analysis of systems, utility bills, and building meter layout are critical to understanding reduction in energy use and potential cost savings.

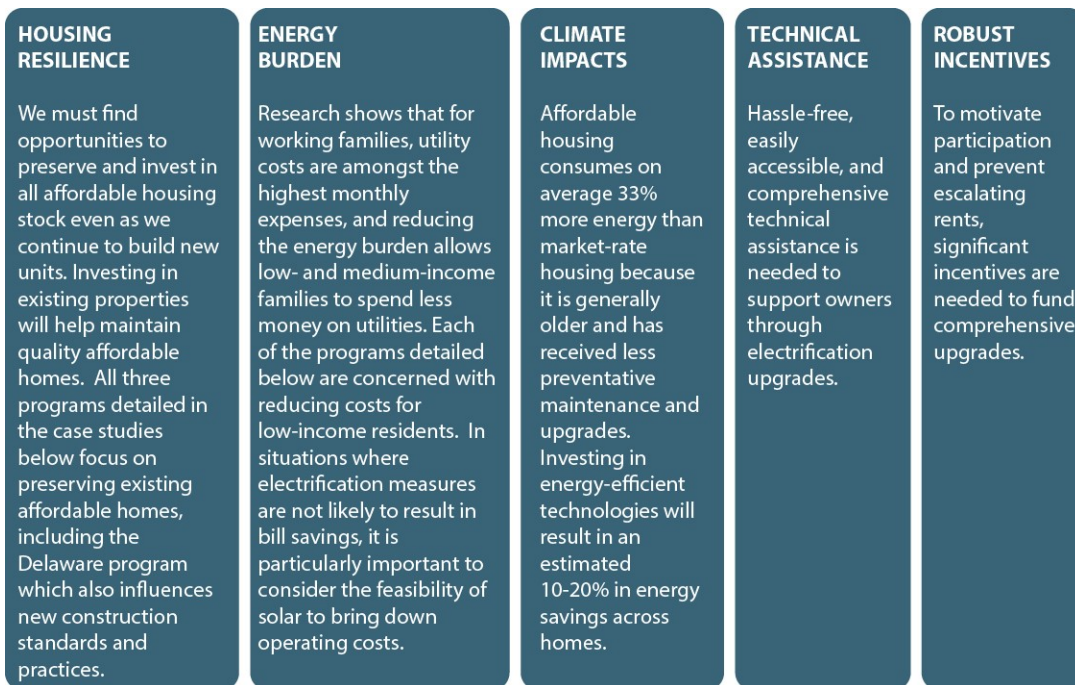
Research shows that for working families, utility costs are among the highest monthly expenses (Cohen 2019). Reducing the energy burden allows low- and medium-income families to spend less money on utilities. Over 46% of renters pay more than 30% of their income towards housing and utilities with a high percentage of black and brown renters having a greater cost burden compared to white renters (JCHS 2021). Most of the unsubsidized affordable housing is in marginalized, environmentally burdened communities (Drehobl 2020). With a history of actively excluding communities of color and of placing environmentally detrimental activities in communities of color, these communities ought to have first access to the benefits of clean energy investments.

Affordable housing consumes on average 39% more energy per square foot than market-rate housing because it is generally older (Cohen 2019). Investing in energy efficient technologies will result in 10-20% in energy savings across housing units. Energy efficiency measures and the addition of solar when appropriate, can result in 50%-75% energy savings (Elevate 2021a).

Current residential programs and market drivers alone are not likely to reach unsubsidized affordable properties. A significant amount of the unsubsidized stock is owned and managed by small, privately owned businesses that have limited time and resources. They often need technical and, in some cases, coordination and financial support to complete the types of upgrades needed to make the unsubsidized affordable stock efficient, fossil-fuel free, and resilient.

Three Program Examples

Despite the significant opportunity and importance of both preserving and electrifying unsubsidized affordable housing stock, these buildings have often been left out of energy efficiency programs because they can be hard to identify, difficult to engage, and require significant support to complete upgrades. Ratepayer programs generally incorporate opportunities and adders for low-income residents; however, for these programs to better serve smaller affordable housing buildings a greater emphasis on outreach and engagement and deep technical implementation assistance needs to be incorporated into programs. Doing so would require changes in cost-effectiveness; greater alignment with programs, such as home repair programs, that are adjacent to utility run programs; and/or aligning with lenders to access additional funds to complete upgrades. An energy efficiency and electrification program focused on unsubsidized affordable housing should address at a minimum:



Based on these five pillars, Elevate and New Ecology have designed and deployed several demonstration projects around the country. Three such programs, each from a distinct climate zone, are briefly described below.

Midwest Case Study

Program Overview	
Name of Program:	Efficiency Navigator
Geography served:	Madison, WI
Type of Housing:	Multifamily rental, 2+ Units
Eligibility:	Low-income census track + HUD fair market rent rates
Measures & Incentives:	Envelope, HVAC, Appliance, DHW; up to \$25,000 per building or 100% of project cost, whichever is lower
Technical Assistance:	Full-service technical assistance offered at no cost to owner
Affordability Covenants:	Rents to be kept at or below HUD fair market rents for 3 years

Elevate in 2020-21 completed a data analysis to understand the volume and size of the unsubsidized affordable housing stock. ACS and National Housing Preservation Database data were used to disaggregate the unsubsidized affordable housing stock volume from market rate volume. Data from the market characterization was used to engage key stakeholders in a series of interviews intended to ground truth the information, gather feedback on the need for programming to address the unsubsidized stock and assess the level of engagement they, as stakeholders, could provide throughout program design and implementation. In Dane County alone, conducted over 25 interviews including with municipal leaders representing local government, water authority, sewage authority, utility, and state agencies; building owners and building managers; and community-based organizations such as the Urban League and Latino Academy of Workforce Development (LAWD). Most interviewees were surprised by the large volume of unsubsidized affordable stock in the region while acknowledging the need to better engage with building owners. In general, there was support for programming but caution on the difficulties of reaching owners and the need for funding of building upgrades to persuade owners to complete efficiency upgrades.

The interviews yielded a smaller group of stakeholders interested in a nine-month program design process. The stakeholder advisory group included: Dane County, Cities of Madison, Sun Prairie, and Middleton, WPPI utility, Madison Gas & Electric, Focus on Energy, Metropolitan Sewage Authority, Madison Water Authority, LAWD, and two building owners. The group met every other month to respond to program design questions. The result of the work was the *Efficiency Navigator* program that provides one stop shop services to owners of small to medium size unsubsidized affordable housing. Key program attributes developed through the advisory group process included: defining building size eligibility for two or more units that are renter occupied; using a focused neighborhood approach to conduct outreach; obtaining a pool of funds to subsidize the upgrades; centering resident needs to reduce energy burden; creating a public-private partnership; obtaining an owner commitment to keep housing affordable for at least five years; and taking a holistic approach that includes health and safety measures, and renewables.

Elevate and our program delivery partner Sustain Dane, completed energy and water assessments in three properties in 2021 that highlighted the opportunities for significant cost

savings for both owners and residents. By the end of 2023 the Efficiency Navigator program has assessed and written detailed reports documenting energy saving and electrification upgrades for 43 buildings serving 269 units. Implementation measures have been installed in 19 of these buildings, reaching 112 units. Table 1 provides a summary of estimated energy, dollars and carbon savings from the Efficiency Navigator program achieved by December 31st, 2023.

Table 1. City of Madison, WI. Estimated Annual Accomplishments by end of 2023:

Annual Cost savings per building	Annual Kwh savings total	Annual Therm savings total	Annual Carbon reduction total
\$625.00	27,507	8,439	52,821kg

The Efficiency Navigator program launched in 2021 and the following year expanded to the City of Middleton with the support of The American Rescue Plan Act of 2021 funds. Since this expansion, the cities of Fitchburg and Eau Claire are anticipated to launch their own Efficiency Navigator programs following similar models. Funding sources across municipalities have varied and all come with their standards of practice, guidelines, and reporting requirements. Understanding programmatic delivery details with multiple funding sources and operating standards that change with each municipality are important elements that must be understood by program delivery staff to achieve success.

The benefit of reduced energy burden directly received by residents along with the community benefits of the Efficiency Navigator program has proven a successful model to reach unsubsidized housing in Dane County, WI.

Mid-Atlantic Case Study

Program Overview	
Name of Program:	Climate Smart Homes
Geography served:	Delaware
Type of Housing:	New construction and gut rehabs of single-family homes (often rowhome / townhome style)
Eligibility:	Affordable housing projects with rents affordable to less than 80% AMI or sales affordable to less than 120% AMI
Measures & Incentives:	Envelope and HVAC measures; \$17,000 for new construction and \$26,250 for gut rehabs with basements
Technical Assistance:	Full-service technical assistance offered at no cost to owner
Affordability Covenants:	Maintain affordability level for minimum of 5 years after occupancy

The Climate Smart Homes (CSH) program is a statewide initiative of Energize Delaware. It evolved from the experience of two grant-funded efforts focused on neighborhood-scale housing stabilization in Wilmington, Delaware’s largest city. For decades, community-based, non-profit actors and public agencies at the city and state levels worked to stabilize the housing

market and improve housing conditions in Wilmington’s Eastside. The neighborhood, a Justice40 community, has experienced decades of disinvestment and residents wrestled with poor housing conditions and high rates of vacancies and abandoned properties. Local actors, including Central Baptist Community Development Corporation, Habitat for Humanity of New Castle County, the Todmorden Foundation, Cinnaire, city government and the local land bank worked collaboratively to spur housing rehabilitation and new construction on vacant lots.

In 2019, New Ecology, Inc. (NEI) staff started to attend public and community meetings convened by these entities and learned of their efforts. To better understand the conditions of existing properties slated for rehabilitation and the development and construction approaches of local developers and contractors, NEI staff visited dozens of vacant homes and discussed design and construction approaches and project costs with architects and developers. Through this due diligence, NEI identified opportunities for building performance improvements that would result in high-performance, all-electric, healthy homes beyond what is required by local building codes. NEI also estimated the incremental cost of these improvements, as compared to code or typical practice, and secured grant funding from Energize Delaware to cover these hard costs and the technical assistance from NEI to support the developers, designers, and construction partners to achieve improved performance.

These experiences resulted in the following performance standard: CSH is grounded in the protocols of nationally-vetted certifications, such as the EPA’s ENERGY STAR and US DOE’s Zero Energy Ready Homes (ZERH) programs, and then goes beyond those elements with an all-electric overlay and threshold requirements to achieve above-code performance, reduce utility costs, and manage moisture (critical in the damp basements of 100-year-old masonry homes) to prevent future indoor air quality and health issues. Specific attributes include:

	New Construction	Gut Rehabilitations
Certifications	ENERGY STAR and ZERH	ENERGY STAR and ZERH protocols to extent practical
Envelope	<ul style="list-style-type: none"> • Continuous exterior wall insulation • Above the deck & roof cavity insulation as appropriate • Air tightness to 1.5 ACH50 • ENERGY STAR Windows $U \leq 0.25$; SHGC: 0.23-0.36 	
Mechanical	<ul style="list-style-type: none"> • Heating and cooling by heat pumps with inverter-based technology: >18 SEER (SEER2 17.2) and >10.5 HSPF (HSPF2 8.9) • Heat Pump Hot Water Heater: UEF >3.3 • Continuous mechanical ventilation provided by an energy recovery ventilator with maximum sensible recovery efficiency (SRE) of not less than 78 	
Foundations	Slab on grade (wherever possible)	Basements shall be treated with a dimple mat on the walls, an interior perimeter drain, and a sump pump



Figure 1. CSH Program Standard (New Ecology 2024)

To support the higher cost of this approach, CSH offers generous incentives sized to cover the incremental cost compared to code-compliant construction: \$17,000 per unit for new construction and \$26,250 per unit for gut rehabilitations with basements. Additionally, CSH provides comprehensive technical assistance to developers, designers, and the construction partners to help incorporate these elements into the project’s design and workflow, including design reviews; on-site contractor training and troubleshooting; diagnostic testing and verification; and education of future occupants or owners regarding operations and maintenance.

The experience and example of the grant-supported initiatives sparked interest among affordable housing developers to pursue more similarly ambitious projects, hence the evolution into a statewide program. One motivation for participants is the exposure to more advanced technologies and construction practices, likely to be required in upcoming code changes, along with the technical assistance to guide effective implementation. In this way, the program functions as an experiential training initiative and one that delivers better quality affordable housing and climate benefits.

While now a statewide program, it is worth highlighting that some of the projects supported through the initial grant investments are not yet complete. Projects have experienced delays resulting from COVID supply chain and inflationary pressures. Furthermore, some projects were delayed due to a change in the general contractor (GC). NEI’s experience in the unregulated affordable housing / NOAH market suggests a higher rate of contractor turnover than in the regulated affordable multifamily sector. This apparent difference could be the result of developers’ reliance on smaller GC firms, indicating a need to provide more robust technical training and operational business development services to enable these smaller firms to thrive.

NEI has estimated energy usage of these homes with HERS models and spreadsheet calculations. HERS models of the newly constructed homes project an estimated annual energy savings of 4,000 kWh, 35% better than code, per unit. NEI used spreadsheet calculations to better reflect the unique elements of existing buildings and the reality that gut rehabilitation of 100-year-old masonry rowhomes rarely meet code requirements for elements such as air tightness. NEI’s models project that the energy usage in CSH gut rehabs will result in energy costs no greater than the counterfactual scenario of gas-fired equipment with typical envelope assemblies. In these gut rehab projects, NEI projects a 60% reduction in MMBTUs annually.

Pacific Northwest Case Study

Program Overview	
Name of Program:	Oregon Multifamily Efficiency Program (OR-MEP)
Geography served:	Electric IOU territory Statewide (~80% of Oregon population)
Type of Housing:	Multifamily Rentals, 5+ Units
Eligibility:	- Residents in $\geq 50\%$ of units are $\leq 80\%$ AMI - Hard-wired electrical heating system served by IOU
Measures & Incentives:	Standard incentives for menu efficiency measures and custom pathway for whole-building efficiency upgrades capped at \$200,000 per project
Technical Assistance:	Full-service technical assistance offered at no cost to owner
Affordability Covenants:	Regulatory Agreement requires that units remain affordable for 10 years (rents cannot exceed HUD determined rent rates affordable to residents with 80% AMI)

The unsubsidized affordable housing sector represents approximately 206,000 units of the available housing stock in Oregon. Preserving the affordability of unsubsidized stock is

widely recognized as critical to state and regional housing strategies, community resilience, and climate change planning. Oregon Housing and Community Services (OHCS), the state housing finance agency, has a longstanding affordable multifamily energy efficiency incentive program for new and existing housing in Oregon. While NOAH housing was not specifically excluded from participation, the program design and marketing strategy catered to subsidized affordable housing developments. In 2022, OHCS determined it needed to make enhancements to the Multifamily Efficiency Program to specifically serve unsubsidized housing. Elevate was engaged to conduct a landscape analysis, including stakeholder interviews, and ultimately propose program design alterations to attract and serve unsubsidized affordable housing properties. The interviews with housing owners who had previously explored participation in OR-MEP revealed a couple of key barriers, including inadequate incentive levels and program navigation complexity.

In collaboration with TRC as the program's administrator, Elevate was brought in to lead outreach and engagement with unsubsidized affordable housing owners. Elevate's experience working with unsubsidized affordable housing stock nationally and evidence from the ongoing interview process of owners in Oregon show that a high-touch program is needed for owners to complete building upgrades and access efficiency incentives. To this end, Elevate provides wrap-around services for unsubsidized affordable housing owners including tailored marketing and outreach in partnership with community-based organizations and full-service technical assistance to facilitate engagement and successful project completion.

The technical assistance offered to unsubsidized affordable housing owners by local Elevate staff through OR-MEP includes:

- identifying building efficiency and health and safety measure opportunities through an onsite assessment
- application support to complete the unsubsidized affordable housing specific application and regulatory agreement
- identifying other sources of funding and incentives
- identifying eligible contractors to implement measures
- developing scopes of work and contractor scheduling
- final walkthrough once the upgrade is completed.

The OR-MEP program eligibility requirements are different from those of the other programs detailed above and are set by OHCS and the state-appointed Housing Council. OR-MEP serves existing or new construction multifamily properties with at least five units per building. Such properties must receive electricity from Pacific Power or Portland General Electric and be heated by a hard-wired electrical heating system. Properties must also meet the affordability requirements, which stipulate that residents in at least 50% of units are at or below 80% AMI, and units must remain affordable for at least 10 years. Finally, to qualify for the enhanced technical assistance offering, unsubsidized properties must demonstrate that they are rental housing that currently maintains low rents without federal subsidies.

OR-MEP offers three program pathways to fit a diversity of project sizes and budgets. The Menu Path is for small efficiency scopes of one or two measures. The Bundled Path provides deeper incentives for more comprehensive scopes including three or more measures. And finally, the Whole Building Path provides an opportunity for a custom project and maximized incentives to enhance property-wide efficiency. The Menu and Bundled Paths offer standard incentives based on the specific building envelope, HVAC, lighting, DHW, and

appliance measures. The Whole Building Path incentives are based on modeled savings of comprehensive energy upgrades and capped at \$200,000 per project.

The redesigned OR-MEP program is relatively young. The first open enrollment period contained priority scoring for unsubsidized affordable housing properties resulted in four project reservations. Those properties are completing project design and specifications now. The second open enrollment period is closing soon. We expect future interest and engagement among unsubsidized affordable housing properties to grow as we begin to focus our engagement activities and relationship development in defined communities.

Several municipalities and regions in the Pacific Northwest are taking notice and expressing interest in developing unsubsidized affordable housing electrification demonstration programs. Elevate is setting up a decarbonization program for small multifamily properties in central Puget Sound with funding from the Community Energy Efficiency Program at Washington State University. We also are in design discussions with a few additional local governments in Oregon and Washington.

Key Learnings

The example programs included above have matured and resulted in many lessons along the way. Elevate and New Ecology have also started new programs in different municipalities and regions, each with unique influences, needs, and nuance. Several of the widely applicable learnings are shared here.

Understanding the Story of Place

The first step in entering a community with the intent of starting an electrification program to serve unsubsidized affordable housing is to slow down and get curious. Listen to community needs, priorities, and barriers. No matter the success of other programs serving other communities, this place has a unique story, and its people have distinct needs. One can and should get a very high-level picture of the contours of a place with data analysis, including housing typology, ownership and conditions; income and population demographics; health and justice community mapping; building systems; utility landscape and incentive offerings; and more. However, to understand the story of a place one must talk to many people with a diversity of interests- contractors and council people, renters and shopkeepers, service organizations and property owners. Continuously showing up is necessary to learn the real needs and opportunities that a successful unsubsidized affordable housing electrification program can serve. In each of the programs identified above, multiple local organizations were engaged before any program design work was initiated.

Community Engagement

Ongoing community engagement is critical to successful implementation, from initial public awareness building and trusted-messenger outreach support to educational events and contractor capacity building. Relationship building and communication with all stakeholders from the client, installing contractor, city building inspector, property owner, and tenants are all very important to the successful implementation of energy efficiency and electrification upgrades. One key point is the continuous and varied nature of the needed engagement. It is not an activity isolated to the design or launch phases of program implementation. A trusted

messenger is needed for demand generation, like Sustain Dane in Wisconsin, the several community organizations in Wilmington, Delaware, and the DEI Committee in Oregon, and we have found that partnering with local, established community-based organizations for ongoing program improvement is key. We have also found, particularly in highly disinvested areas like the Wilmington program, the need to develop and provide comprehensive technical training and ongoing business support to designers and contractors.

Timelines

Timelines are long. Whether for new construction and homeownership projects or rehabbing existing multifamily, it often takes an extended time to move from project definition to completion. Two years or more between project conception and completion is not uncommon. The extended timeline can be attributable to several things, including complicated scopes arising out of deferred maintenance or initial low-cost design decisions to the simple fact that owners often have limited capacity and/or building science experience. Program design for unsubsidized affordable housing needs to anticipate patient capital and sustained support.

Housing Conditions

One discouraging discovery is that often the owners interested in participating have building-level problems that energy efficiency and electrification programs don't have money to solve, such as end-of-life roofing, moisture intrusion, and health and safety measures. Ideally, a program administrator can build a capital stack with diverse funding sources and funder objectives such that as many of these types of building deficiencies as possible can be addressed alongside an energy efficiency upgrade.

Contractor Ecosystem

Skilled construction contractors and tradespeople are not always enthusiastic about participating in a new "program." In truth, these unsubsidized affordable housing program parameters can be difficult and inconvenient for contractors. The Efficiency Navigator in Wisconsin, for example, requires a three-party contract with Elevate as the implementer, joining the contractor and owner in the construction agreement. Payments can be slower and subject to additional oversight. Sometimes established invoicing and incentive processing systems require changes to accommodate program requirements. It can be frustrating if clear expectations and good communication are not established. Regardless, both the participating contractors and the program implementers will require patience and flexibility.

Whole-home approach

One finding is the need to clearly and consistently limit our programs to a whole-building approach where deep energy efficiency and electrification without an energy cost increase to low-income residents is the goal. In a few of our programs, we are adjusting our assessment report and project recommendation templates to read as a single, integrated, electrification approach rather than as an ala carte menu of measure options. Because we are seeking to lock in as much efficiency savings as possible in a single project, a whole-building approach is necessary to achieve electrification goals. This comprehensive approach will become even more

critical to program sustainability as incentive funding sources, such as the programs being developed under IRA and BIL, require material carbon reduction strategies.

Rent Stabilization

Now that we are a few years into the early demonstration programs, we have an opportunity to go back and evaluate resident and owner satisfaction and the performance of the energy upgrades. With this evaluation, we will also be able to determine whether the rent restrictions built into the initial program designs were effective at preserving affordability in the case of rental units and increasing the opportunity for wealth-building for low-income home buyers. This post-completion evaluation is just getting underway and will give us key information for future program improvements.

Paying for Projects- New Opportunities for Deeper Impact

As highlighted throughout, an integral role of an unsubsidized affordable housing efficiency program implementor is to braid multiple funding sources- up to 10 available sources for some buildings- to achieve the deepest energy efficiency and comprehensive fuel switching upgrade possible at the lowest first cost to the owner. These projects are generally very price-sensitive because owners are operating small businesses on limited margins with slim or non-existent capital reserves. More complicated even to the financial viability of an efficiency or electrification project is that while owners are responsible for costs associated with the capital upgrades, residents who pay the utility bills reap the cost benefits of efficiency improvements. This is the ubiquitous split incentive problem. Despite the underlying property-level financial realities, program implementers can and do get creative in assembling sufficient resources to make these projects viable, and new Federal funding sources are creating an opportunity to scale programs for deeper impact.

The Efficiency Navigator program in Wisconsin was designed to leverage available incentives through the statewide energy efficiency program, Focus on Energy, as well as other grants and incentives such as the toilet upgrade rebates through the water utility and water softener tune-up through the sewage authority. Available incentives cover approximately 20% of the initial upgrade costs for energy measures requiring the remainder of the upgrade to be covered by other funds such as building reserves, grants, or loans. Elevate has been able to bring in grant funds to cover most or all the incentive funding shortfall and fully pay for efficiency upgrades. Funding for CSH comes from the Energize Delaware Empowerment Grant and a research fund of the Delaware Sustainable Energy Utility. As noted above, there are no other programs in the state that offer energy efficiency resources to support the type of projects CSH serves. The CSH grants are sized to cover the incremental cost of construction to achieve all-electric homes with energy utility expenses modeled to be no more than a conventional home, built to code, with natural gas for heating and domestic hot water. The OR-MEP program leverages OHCS incentives as well as compatible Energy Trust of Oregon energy incentives, local water utility, municipal, weatherization, and state-wide heat pump incentives where available. In all programs, a layer cake approach to funding project costs is necessary.

The Inflation Reduction Act (IRA) and Bipartisan Infrastructure Law (BIL) constitute a once-in-a-lifetime opportunity for the residential market, including unsubsidized affordable housing properties, to access federal funds for clean energy solutions such as energy efficiency, solar, energy storage, and electrification. These funds provide an opportunity to close funding

gaps. While the federal investments are massive, they will not be sufficient to comprehensively cover the carbon reduction building sector goals. Also, inconsistent application across states will add complexity and will hinder access. A few of the most applicable IRA opportunities to unsubsidized affordable housing programs are set forth below. This is a high-level overview and not meant to be comprehensive of even the three most relevant programs specifically identified below.

Home Energy Performance-Based, Whole-House Rebates (HOMES) is a program that provides rebates for whole-house, energy efficiency improvements above threshold levels. It is available to all homeowners and multifamily building owners, with increased rebates available to households at or below 80% AMI or multifamily buildings where at least 50% of the tenants are at or below 80% AMI. The rebate amount is based on whether savings are measured or modeled, LMI or non-LMI status, and the percentage of energy reduction due to the improvements. This and the High Efficiency Electric Home Rebate Program below are funded by the United States Department of Energy via grants to States. It is expected that the majority of states will have announced program specifics by the end of 2024, with most states rolling out rebates in late 2024 or early 2025.

Table 2. Home Energy Performance-Based, Whole-House Rebates (HOMES) amounts:

Calculating Value and Limits – MODELED SAVINGS	Single Family:		Multifamily (per unit):			
		20-35% Savings	35%+ Savings		20-35% Savings	35%+ Savings
	LMI (<80% AMI)	80% of cost, up to \$4,000	80% of cost, up to \$8,000	LMI (50% units are <80% AMI)	80% of cost, up to \$4,000	80% of cost, up to \$8,000
	Non-LMI	50% of cost, up to \$2,000	50% of cost, up to \$4,000	Non-LMI	\$2,000 per unit \$200,000 per building	\$4,000 per unit \$400,000 per building
Calculating Value and Limits – MEASURED SAVINGS	LMI (<=80% AMI): 80% of cost or \$200 per 1% energy reduction versus state average. Non-LMI: \$100 per 1% energy reduction versus state average; no cap					

The High Efficiency Electric Home Rebate Program (HEERHA or HEAR) is a rebate program for households that are below 150% AMI, including multifamily buildings (including tribal, nonprofit, and public housing) that have at least 50% of residents below 150% AMI. This is a state and Tribal administered program that provides point-of-sale rebates for electrification projects such as electric panels and stoves, heat pumps, and insulation. Households under 80% AMI are eligible for a rebate of 100% of the costs up to \$14,000. Households between 80% and 150% AMI are eligible for a rebate of 50% of the costs up to \$14,000. Multifamily buildings with over 50% of residents below 80% AMI are eligible for a rebate of 100% of the costs up to \$14,000 per unit. Multifamily buildings with over 50% of residents below 150% AMI are eligible for a rebate of 50% of the costs up to \$14,000 per unit. Administration and roll-out will vary from state to state which will affect the ease of access for housing owners. States such as Wisconsin and Oregon with statewide efficiency programs will offer these rebates as part of the existing statewide infrastructure which should make the programs more accessible. In Delaware, there is on-going discussion with the state energy office regarding coordination of the coming rebates with existing programming, such as that through Energize Delaware. However, without

a strong network of program navigators and contractors knowledgeable about the rebates and alignment with existing efficiency programs it is unlikely that owners of small, unsubsidized affordable housing will benefit. Additionally, owners of unsubsidized affordable housing are eligible for Investment Tax Credits (ITCs). The most common ITC incentive for use with solar and storage applications for unsubsidized affordable housing is the Section 48 and 48E tax credit. It is available to commercial owners, nonprofits, government entities, and Tribes, as well as individual taxpayers who may own NOAH properties through single member LLC structures (subject to certain Passive Income restrictions). It provides for a base tax credit of 30% of the cost basis if the solar and/or storage project is under 1 MW or Prevailing Wage and Apprenticeship requirements are met. There is also a 10% adder if the project meets Domestic Content rules, as well as a potential 10% adder if the project is located in an Energy Community. Additional adders are available on a competitive application basis if the project is: 1). Located in a low-income census tract (10%); or 2). Located in a Tribal area (10%) or 3) if the property is a Federally subsidized housing project (20%); 4) or meet a 50% economic benefit test (20), providing for a maximum aware up 70%. Importantly, the IRA's Elective Pay (or Direct Pay) option allows eligible tax-exempt non-profits, governments, and tribes to receive a direct tax refund of the credit from the IRS, in addition to the alternative path to monetization through a Tax Equity financing structure. Taxable owners can realize the ITC directly, pursue a Transfer of the ITC for cash, or participate in a Tax Equity financing structure. A finding from initial analysis of NOAH projects in the Wisconsin program is that some building owners are not eligible for the tax credit if the building ownership is not structured as a commercial entity. Additionally, the complexity of the tax credit programs will require owners to work closely with a tax advisor.

The Greenhouse Gas Reduction Fund (GGRF) is the largest program in IRA at \$27 billion and is administered by the U.S. EPA. GGRF includes the National Clean Investment Fund, the Clean Communities Investment Accelerator, and Solar for All. The three funds are designed to work together and provide loans, grants, and technical assistance to qualified projects. At the time of publishing, it is expected that the NCIF and CCIA programs will require projects to achieve Net Zero greenhouse gas emissions or be on a path to achieve zero emissions over time. Because of the structure of the GGRF funds, the technical complexity of electrification projects, and the inherent difficulties in reaching unsubsidized housing owners, it is imperative that programs such as those described herein become versed in the GGRF and refine program designs to include options for upgrades that meet the requirements of a qualified project and achieve a certain minimum greenhouse gas reduction to make GGRF loans and grants more accessible to owners. One strategy is for programs to align with local Community Development Financial Institutions, local green banks, and/or credit unions that will be on the front lines of providing GGRF loans in local markets.

In short, unsubsidized affordable housing program implementers must discover how to access this historic funding within specific program parameters and ensure this unprecedented investment makes it into unsubsidized affordable housing.

Conclusions

Unsubsidized affordable housing is often left out of clean energy programs because it can be hard to identify, difficult to engage, and requires significant support to complete upgrades. While barriers exist making this sector somewhat more difficult to serve, the opportunity to preserve and improve affordable housing while materially advancing climate goals is too

important to pass up. The industry can design unsubsidized affordable housing clean energy programs in ways that advance community priorities, housing stability, climate resiliency, and equity imperatives.

This paper outlines three program models seeking to make unsubsidized affordable housing more efficient and resilient, within a climate and equity framework that advances affordable housing preservation, workforce development, decarbonization, and wealth building. Elevate and New Ecology have found that the unsubsidized affordable housing sector differs in critical ways from other housing types including subsidized affordable housing. While some best practices from other program types are transferable, such as the use of comprehensive one-stop-shop technical assistance, new strategies are needed. Sustained engagement and community-based organization outreach strategies are particularly important, as are patient capital, flexible contractors, and a heightened need to braid numerous and substantial funding sources. For electrification programs, where all-electric buildings are more costly to operate than buildings burning natural gas in many areas of the country, we need to approach projects in a comprehensive manner rather than from a limited measure-based energy efficiency program perspective.

The once-in-a-lifetime climate funding from the Federal government opens an opportunity to meaningfully scale unsubsidized affordable housing investments. The program examples described here, and the many others complementing and improving on these program designs, will help our industry evolve new ways to facilitate braided investment in the built environment and advance energy, climate, and equity objectives for all.

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