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Energy Equity: Harnessing Cyclical Investment for a Sustainable and Just Residential System

Introduction

As days of increased temperature become more common in the US, the need to limit emissions grows increasingly imminent. While this predicament usually focuses on the transportation sector due to its outsized proportion of GHG emissions and high potential for change—technologically and behaviorally—other areas such as the residential sector are crucial, not only for meeting Boston’s carbon neutrality goals for 2050, but also for ensuring robustness for the homes of Massachusetts residents.

Decarbonization of the residential sector is an immense task that deals with already existing, already occupied buildings. While residential decarbonization is often presented through inaccessible options such as solar panels or controversial items such as the electrification of stovetops and ovens, optimization of energy efficiency is much more complex, including insulation, energy-efficient appliances and heat pumps, and certain building codes and retrofits. However even the accessibility of these options brings up the question of equity in a push for sustainable solutions.

With this in mind, this investigation looked into the Mass Saves program for Deep Energy Retrofits (DERs). Created in 2008 by the Green Communities Act, the Energy Efficiency Advisory Council (EEAC) is an advisory body that plays a key role in overseeing and guiding energy efficiency programs in the state of Massachusetts. The council provides input and recommendations on the planning, development, and implementation of energy efficiency programs, with the goal of helping residents, businesses, and institutions reduce energy consumption, lower costs, and cut greenhouse gas emissions. It is made up of stakeholders including representatives from state agencies, energy utilities, consumer advocates, and other interested parties, with the ultimate roles of oversight, advisory, evaluation, and collection of public insight.

Regular meeting minutes are available and easily accessible online for those with time to spare. Beginning with these, this study looked for inefficiency that may have been expressed, with particular focus aimed towards inequality for those involved in the Low-Income Energy Affordability Network (LEAN) program. This initiative is aimed at helping low-income residents reduce their energy bills by improving the energy efficiency of their homes. The program provides free or heavily subsidized energy efficiency services and upgrades to eligible households, with the goal of lowering energy consumption, improving comfort, and reducing costs for those who may struggle to afford energy expenses.

The EEAC's Mass Save and LEAN programs have demonstrated transparency, continuous development, and equity that extends beyond economic considerations. These initiatives implemented in Massachusetts have not only been successful but also exemplify a sustainable model worthy of replication by other programs. This case study examines the work of the EEAC, focusing on the prioritization of transparency and user input, the ongoing evolution of the program, and the importance of multi-party benefit in large scale investment projects. The analysis underscores the efficiency and applicability of these initiatives as a proven and replicable model.

Transparency and Evolution

The act of informing somebody, incentivizing them to go through tedious paperwork, and gaining authorization to enter their home multiple times is difficult, but it begins with informing people. The marketing of DERs has expanded abundantly in recent years, targeting potential customers of all income classes. To successfully realize a marketing campaign like this, it must be diverse and user-driven. EEAC marketing strategies include website integration, phone-contact through utility accounts, tailored-marketing strategies such as word of mouth, radio, community centers, TV commercials, and multilingual support. Customers engage through a variety of channels, such as calling a CAP agency, calling the EEAC, responding to HPC phone calls, or submitting a program application through the website.

Diverse marketing strategies are crucial in order to ensure the success of a community-based program like this, but transparency is decisive in attaining customers. The EEAC ensures transparency through easily navigable websites that showcase their multiple mechanisms of advising, researching etc..., whereas LEAN does so through clear demonstration of no-cost ‘upgrades’, income eligibility, the installation process, and strong results. Marketing strategies disseminate the message, but transparency of eligibility, process, and results ensure that customers will be incentivized to participate.

Yearly studies are realized in order to receive customer feedback about the process. Feedback is collected, and the program evolves in order to accept the most customers possible. This is of utmost importance in the LEAN program, whose mission is to attract low income customers, ensure an accessible process, and retrofit as many homes as possible. This is a difficult task for many reasons. With LEAN being a state-level mandate for private utility companies to fund which has been delegated to nonprofit agencies to implement—there are a lot of people and players involved at every step, and sometimes goals are in conflict. Most importantly, there are many players involved in this program, yet accessibility must still be ensured.

Action for Boston Community Development (ABCD) plays a prominent role within the Low-Income Energy Affordability Network (LEAN) but remains constrained by its reliance on program funding from larger utility companies. This dependency hinders the pursuit of innovative or unconventional projects, even when such initiatives could provide significant benefits to individuals and communities. For example, LEAN is currently unable to electrify properties heated by National Grid gas, as the utility does not provide a mechanism to assess the cost-effectiveness of these projects. Without such an evaluation framework, these proposals cannot secure approval. This dynamic illustrates how corporate interests can obstruct progress in energy efficiency and decarbonization—objectives critical to combating climate change, reducing heating costs, and enhancing home comfort.

Despite these challenges, LEAN has established a robust process for documenting, systematizing, and addressing programmatic issues to support the network’s continuous improvement and growth. Within ABCD alone, staff capacity has nearly doubled over the past year. The agency has prioritized

problem-solving, process standardization, and strengthening collaboration with other community action partners across the state.

At the Energy Efficiency Advisory Council (EEAC) level, the inclusion of diverse stakeholders—nonprofit agencies, housing advocates, and climate organizers—creates a vital platform for dialogue with utility companies about the details of the three-year planning process. These conversations drive efforts to set ambitious goals, secure additional funding, and enhance outreach to marginalized populations in the program's next iteration.

Maximized Returns from a Single Investment

The Mass Save Energy Efficiency Advisory Council (EEAC) model, particularly through the LEAN (Low-Income Energy Affordability Network) program, serves as a vital tool in addressing energy inefficiency in Massachusetts. By targeting low-income households, LEAN enables access to cost-effective home energy retrofits, which are crucial in reducing energy consumption and costs for those who are most vulnerable to energy poverty. The program's results demonstrate significant success in reducing heating and cooling costs, improving energy efficiency, and addressing environmental concerns through energy conservation. The strong results of LEAN, such as reduced energy bills and improved comfort for residents, underscore the importance of energy efficiency programs that specifically cater to underserved communities.

The LEAN program is multifaceted in its approach, addressing both climate impacts and the equitable mitigation of these impacts. By retrofitting homes in low-income areas, the program not only reduces carbon footprints but also alleviates the disproportionate energy burdens faced by vulnerable populations. It contributes to a broader effort to combat climate change by decreasing the demand for fossil fuels and promoting the use of cleaner, renewable energy sources. At the same time, it helps to ensure that the most marginalized communities are not left behind in the transition to a greener, more sustainable future, thereby promoting environmental justice. The results of LEAN also go beyond just

energy savings, improving the health and well-being of residents by reducing indoor air pollution and enhancing living conditions.

This strategic model benefits all parties involved, creating a win-win scenario for utilities, contractors, residents, the government, and the environment. Utilities gain from the energy savings, which contribute to meeting state-mandated energy efficiency targets, while contractors benefit from increased demand for retrofitting services. Residents, especially those with lower incomes, experience financial relief and improved living conditions, while the government strengthens its commitment to addressing climate change and promoting equity. Moreover, the environment reaps the rewards of reduced emissions and the shift toward more sustainable energy practices. The LEAN program exemplifies the importance of sustainable, strategic models that prioritize equity while achieving comprehensive environmental and societal benefits. The specific results are best summarized below.

What We've Done Since 2013, we have:	What We're Going To Do Under the 2025-2027 Plan, we aim to:
 Weatherized approximately 350,000 homes, including 70,000 low-income households.	Weatherize 174,000 homes, including approximately 48,000 low- and moderate-income households.
 Supported the installation of heat pumps in over 75,000 homes and businesses (since 2019), including 3,600 low-income households.	Support the installation of heat pumps in over 115,000 households, including 16,000 low- and moderate-income households.
 Reduced greenhouse gas (GHG) emissions by 3.7 million metric tons of carbon dioxide equivalent (CO ₂ e), the same as of taking 800,000 cars off the road for a year.	Reduce GHG emissions by 1.0 million metric tons of CO ₂ e.
 Delivered over 153 million megawatt-hours (MWh) and 4.7 billion therms in energy savings, as well as \$31 billion in total benefits to customers.	Deliver 9.8 million MWh and 11 billion therms in energy savings and \$13.8 billion in total benefits to customers.
 Invested \$1.1 billion in improvements that lower energy bills and improve health, safety, and comfort for low-income households.	Invest over \$1 billion in incentives paid for low- and moderate-income customers and renters.
 Provided \$6.7 billion in customer incentives.	Provide over \$3.5 billion in customer incentives.

Project Conclusions

In conclusion, the Mass Save EEAC model, especially through the LEAN program, serves as an effective framework that can be replicated in other regions and systems striving to tackle energy inefficiency while advancing equity. This project has significantly broadened my understanding of how equity is integral to the success of energy programs, illustrating that energy transition efforts must be inclusive to ensure that the benefits are distributed fairly across all communities. The LEAN program highlights that energy efficiency initiatives can be designed to address both environmental and social concerns, emphasizing the need for a multifaceted approach to achieve long-term sustainability.

Throughout my research, I've realized that much work has already been done in this area, with numerous studies, policies, and programs striving to improve energy access for underserved communities. However, challenges such as bureaucratic red tape, barriers to effective remediation, and difficulties in retrofitting multi-family homes still present significant obstacles. These issues complicate the full realization of the benefits that energy efficiency programs can offer, particularly in low-income and multifamily settings. Despite these ongoing hurdles, the progress made thus far is promising, and the path forward requires continued adaptation and refinement.

The LEAN program's ability to evolve in response to feedback provides hope that these obstacles will be addressed over time. By remaining flexible and open to new strategies, programs like LEAN have the potential to contribute significantly to larger carbon reduction goals for 2030 and 2050. As the program evolves, it will not only enhance energy efficiency for low-income households but will also play a key role in achieving sustainable, equitable solutions for a low-carbon future. The continued success and adaptation of such programs are essential to realizing broader climate goals while ensuring that no community is left behind.