



Breaking Down Barriers: Exploring Program Models to Unlock Multifamily Energy Efficiency

Aditya Nochur, Graduate Student, MIT Department of Urban Studies and Planning

Harvey Michaels, Principal Investigator

MIT Energy Efficiency Strategy Project

77 Massachusetts Avenue

Cambridge, MA 02139

617-253-2084

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ABSTRACT

Tremendous potential for energy savings exists in multifamily housing, yet uptake of energy efficiency retrofits in the multifamily sector has historically lagged behind the single-family housing sector. This is largely due to general barriers to efficiency that are particularly pronounced in multifamily housing, including high upfront costs for upgrades and split incentives between landlords and tenants.

In coordination with the City of Cambridge, Massachusetts and the local utility NStar, a group of graduate students in the Department of Urban Studies and Planning at MIT have designed a multifamily efficiency pilot program to incorporate lessons learned from the Solarize Massachusetts and MPower Oregon programs which use a community-based social marketing and a tiered pricing scheme to increase the uptake and drive down costs.¹

The proposed Cambridge pilot focuses on streamlining the retrofit and financing - a *one-stop shop* to enable customers to access multifamily efficiency services in a streamlined fashion at no upfront cost.

Key features were:

- Selecting a single Program Implementer to guide customers through all stages of the process, including outreach and marketing, scheduling and conducting energy assessments, assembling a financing package, installing retrofit measures, and tracking post-retrofit performance.
- Simplifying and streamlining the loan process by building targeted partnerships between utilities and pre-qualified banks and contractors to offer loan products and provide customers instant approval upon completion of an energy assessment.
- A retrofit certification program to provide the basis for rent negotiations between landlords and tenants. This will enable both parties to make adjustments to the rent if necessary as lease terms expire and are renewed.

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Background: Energy Efficiency Potential in the Multifamily Sector

Conservative estimates of energy efficiency potential in the U.S. multifamily sector suggest that energy savings of nearly 30 percent by 2020 are achievable, representing reductions of 51,000 gigawatt-hours in electricity consumption, 2,800 million therms in natural gas consumption and 50 million tons of carbon dioxide emissions, as well as a \$9 billion value to landlords and tenants (Benningfield Group 2009). Further analysis focused on low-income multifamily properties finds potential savings of 10,800 gigawatt-hours and 599 million therms across 6.5 million apartments receiving either assistance from the Department of Housing and Urban Development (HUD) or Low Income Housing Tax Credits (Benningfield Group 2010). These properties comprise 21 percent of the U.S. multifamily market, highlighting the potential for significant scale and impact if efficiency programs that initially focus on the low-income/affordable multifamily housing sector are expanded to serve market-rate housing. Social equity provides a clear rationale for targeting energy efficiency programs to low-income households: they are more severely burdened by energy costs, spending nearly 20 percent of their monthly income on energy bills compared to 4 percent for the average household (Bennington Group 2009).

Investments in energy efficiency retrofits can reduce this cost burden. They can also bring a variety of additional benefits to low-income building residents, including ensuring the long-term viability of existing affordable housing, creating jobs and broader economic impacts, increasing health, safety and comfort and reducing greenhouse gas emissions (Deutsche Bank 2012). However multifamily housing residents face significant challenges in accessing energy efficiency services. Approximately 88 percent of multifamily households are renters, whereas 86 percent of all single-family homes are owner-occupied, and renter household incomes (approximately \$31,000/year) are roughly half those of owner households (approximately \$61,000/year) (Benningfield Group 2009). These statistics show that as renters, multifamily housing residents have significantly less income to use for upfront investments in energy efficiency measures. As renters they also lack incentive to invest in their units if they are not going to remain there long-term; at the same time, their landlords are unwilling to invest in efficiency if they do not realize any financial benefit from doing so. Overcoming this split incentive barrier between tenants and landlords, as well as the high upfront cost barrier, will be critical to realizing efficiency potential in the multifamily sector.

On-Bill Repayment: One Means to Overcoming Efficiency Barriers

On-bill repayment is one promising approach to addressing the aforementioned barriers to multifamily efficiency. Under on-bill repayment utilities and other parties make upfront investments in energy efficiency measures and the ratepayer then pays these initial investments back over time via a monthly surcharge on his/her energy bill. As a result the upfront cost barrier is largely eliminated, and the customer further benefits if the payback terms are structured such that the resulting monthly energy savings exceed the monthly repayments. On-bill repayment can also overcome the split incentive barrier in multifamily and rental properties if the monthly repayments are tied to specific properties via tariffs on utility meters. This ensures that tenants and landlords do not have to continue paying the cost of energy efficiency upgrades after they move out of a property or sell a building; instead, new tenants or building owners assume responsibility for the monthly repayments where the previous tenant or

owner left off. This on-bill tariff approach stands in contrast to on-bill loans, which are non-transferrable and stay with the original borrowers even after they move out of a unit or sell a building.

While on-bill repayment mechanisms can present an elegant solution to upfront cost and split incentive barriers, utilities have often faced challenges in implementing such measures because doing so can require complicated changes to their billing systems (Bell, Nadel and Hayes 2011). Utilities are also sometimes hesitant to enact on-bill repayment policies due to concerns that it will put them in the position of acting as financiers – a role beyond their traditional expertise that can increase overhead costs and expose them to liability under consumer lending laws (Copithorne and Fine 2011). To address these issues, effective programs must leverage outside sources of capital and enable utilities to act as capital intermediaries rather than fund managers. Given these considerations, different programs utilize a variety of approaches to overcome barriers to energy efficiency. As we shall see, MPower Oregon primarily uses on-bill repayment to drive energy efficiency uptake, whereas Solarize Massachusetts and the proposed multifamily pilot in Cambridge use tiered pricing and streamlined retrofit and financing offers, respectively, in the absence of viable on-bill repayment mechanisms.

MPower Oregon: Applying On-Bill Repayment to the Affordable Multifamily Sector

Building off the success of Clean Energy Works Oregon, a program that focused on single-family residences using on-bill loans, MPower Oregon uses an on-bill tariff mechanism to address the particular needs and challenges of rental populations in multifamily affordable housing. The program fund covers the entire upfront costs of energy and water efficiency improvements in these properties. Building owners then enter into energy services agreements with utilities to pay back the efficiency tariff over a 10-year period, and the arrangement is structured so that the monthly reductions in energy bills exceed the tariff amount. A portion of the energy savings are captured by landlords and tenants (whoever pays the energy bill), with the balance used to recapitalize the program fund to pay debt service and possible investors (Blue Tree Strategies 2011).

After receiving a \$3 million Energy Innovation Fund grant from the U.S. Department of Housing and Urban Development (HUD) to help capitalize its initial funds, MPower Oregon launched as a two-year pilot in May 2012 with goals of retrofitting 30 buildings totaling 2,500 units by April 2014 (Warner and Daniel 2012). The program also seeks to realize \$1.7 million in energy savings over 10 years, reduce carbon dioxide emissions by 1,300 tons annually and invest \$8.1 million in affordable housing stock (U.S. HUD 2012), and to achieve long-term energy savings of 20 percent (Daniel 2012). MPower Oregon currently draws 30 percent of its funding from utility incentives, 20 percent from HUD grants and 50 percent from Community Development Financial Institution (CDFI) debt; in the long term the program seeks to structurally supplant the HUD grants with equity from New Market Tax Credits to ensure sustained financing (Warner 2012). The fund is managed by the non-profit Network for Oregon Affordable Housing, with technical assistance and service delivery provided by a number of partners including the utility Portland General Electric, the non-profit Energy Trust of Oregon and the CDFI Craft3 (Warner and Daniel 2012).

While MPower Oregon is still in its initial phases, program advocates are already looking to replicate the general model in other markets upon proof of concept. These efforts are largely being spearheaded by Green for All, a national organization working to build an equitable green economy. Potential replication markets for MPower include New York, Chicago and Detroit, as well as the Midwest and New England more broadly (Daniel 2012, Warner 2012). These areas have been identified based upon several criteria, including whether they are urban areas that have a high density of affordable multifamily housing, whether they are climate-intense regions where 20 percent energy savings represents a significant cost reduction, whether there is local demand and political will around multifamily efficiency, and whether local utilities are willing to innovate with on-bill repayment (Daniel 2012). While an initial focus on affordable housing populations is consistent with Green for All's equity-driven mission, there is potential to eventually expand the MPower model to cover market-rate multifamily properties (Daniel 2012, Warner 2012).

Solarize Massachusetts: Driving Energy Upgrades Through Tiered Pricing

In the spring of 2011 the Massachusetts Clean Energy Center (MassCEC) and the Department of Energy Resources (DOER) launched the Solarize Massachusetts initiative to help meet Governor Deval Patrick's goal of installing 250 megawatts of solar capacity in the state by 2017 (Solarize Massachusetts 2012). The program was initially piloted in four communities and its initial success led to its expansion to 17 communities in 2012. Solarize Massachusetts has driven adoption rates of small-scale solar projects in its target communities to be 20 times higher compared to business as usual (Solarize Massachusetts 2012). Customers have the option of either purchasing their solar system outright or entering into a lease or power purchase agreement in which they purchase the energy from the panels and the installer maintains ownership of the system.

Coordinated education, marketing and outreach campaigns driven by municipal leaders, solar installers and grassroots volunteers to target home and business owners, as well as a tiered pricing structure that drives down costs as more people participate, have been central to the success of Solarize Massachusetts (Solarize Massachusetts 2011). These program components have enabled solar installers to lower their customer acquisition costs and pass the resulting savings onto customers. As more solar capacity is contracted in a given community, the price individual customers pay for the energy from their installed solar panels decreases. This gives community members a powerful financial incentive not only to participate in the program, but also to engage their fellow residents and encourage them to participate as well. Having firm deadlines for customers to sign up to participate in the program has also spurred increased adoption rates (Solarize Massachusetts 2012). There is potential to replicate the Solarize Massachusetts model to increase community uptake of energy efficiency (Youngblood 2013), and researchers have proposed a similar approach for a multifamily efficiency pilot program in Cambridge to reduce the upfront costs of home energy assessments and spur greater community engagement around energy efficiency (Cambridge Community Energy Innovations 2013).

Cambridge Multifamily Pilot: Streamlining Process and Financing to Spur Efficiency Demand

In coordination with the City of Cambridge, Massachusetts and the local utility NStar, a group of graduate students in the Department of Urban Studies and Planning at MIT have designed a multifamily efficiency pilot program to tentatively be implemented in the fall of 2013. (Note: this author was part of the graduate student team that designed the pilot as part of the Cambridge Community Energy Innovations practicum.) As mentioned above, the proposed pilot seeks to incorporate lessons learned from the Solarize Massachusetts program by using community-based social marketing and a tiered pricing scheme to increase the uptake and drive down the costs of home energy assessments. The pilot design also recognizes that on-bill repayment may not be feasible in the near term, as NStar has declined to implement such mechanisms in the past in Cambridge due to the need for billing system upgrades (Cascadia Consulting Group 2008). Given these opportunities and constraints, the Cambridge pilot focuses on streamlining the retrofit and financing processes for customers to help increase participation in multifamily energy efficiency programs.

Since home energy upgrade processes are often complex and involve many players, the graduate student team recommended that the Cambridge pilot select a single Program Implementer to guide customers through all stages of the process, including outreach and marketing, scheduling and conducting energy assessments, assembling a financing package, installing retrofit measures, and tracking post-retrofit performance (Cambridge Community Energy Innovations 2013). Given that NStar could not implement on-bill repayment in the short term, we had to devise alternate mechanisms for addressing the upfront cost and split incentive barriers. The existing utility HEAT loan program in Massachusetts, which offers building owners loans (up to \$25,000 for 1-4 unit buildings and up to \$100,000 for commercial buildings) at zero-percent interest for qualified energy efficiency measures, provided a starting point for our programmatic recommendations. While the zero-percent interest loan inherently addresses the upfront cost barrier, the time and complexity of the current HEAT loan application process present significant challenges to potential program participants (Cambridge Community Energy Innovations 2013). To address these issues, we proposed simplifying and streamlining the HEAT loan process by building targeted partnerships between utilities and pre-qualified banks and contractors to offer loan products and provide customers instant approval for HEAT loan financing upon completion of an energy assessment. The financing process will be supported by the single Program Implementer as previously described.

To address the split incentive barrier, the graduate student team also proposed the development of two additional tools: 1) a retrofit certification program to provide the basis for rent negotiations between landlords and tenants and 2) an energy efficiency savings calculator to model projected energy savings post-retrofit and provide data on the costs and benefits of specific retrofit measures. Based on the results of the energy efficiency savings calculator, the retrofit certificate will provide justification for landlords to charge tenants slightly higher rents than they would ordinarily pay, as long as the monthly rent increase is less than the projected monthly energy savings. (In some respects this is similar to a green lease model, only without the added complication of needing to create a lease addendum, as the additional rent payment will be integrated into the base lease.) This arrangement will ensure that tenants can reap the financial benefits of energy efficiency, while also enabling landlords to pay back the initial HEAT loan over time via the slightly increased monthly rent payments from their tenants. While

the initial certificate will be based upon projected energy savings, the pilot program will track actual energy performance data in the long term, and this data will be presented to landlords and tenants each year via a reissuance of the original certificate. This will enable both parties to make adjustments to the rent if necessary as lease terms expire and are renewed. The retrofit certification program and the energy efficiency savings calculator will also be supported by the single Program Implementer, providing a one-stop shop to enable customers to access multifamily efficiency services in a streamlined fashion at no upfront cost.

Conclusion: Pathways Forward for Multifamily Efficiency

Financial barriers to energy upgrades are well documented, and different programs across the country are taking innovative, yet somewhat divergent approaches to overcome these obstacles. MPower Oregon utilizes on-bill tariff repayment mechanisms to address upfront costs and split incentives, Solarize Massachusetts uses a tiered incentive structure to spur customer participation, and the proposed pilot in Cambridge builds off of existing efficiency loan programs to provide an integrated package of services. These approaches need not be mutually exclusive; as described earlier, the Cambridge pilot design proposes tiered pricing as a means to increase landlord and tenant participation in home energy assessments. Similarly, in the long term on-bill repayment can be integrated into the Cambridge pilot in ways that utilize and reinforce other program elements, including the previously described streamlined HEAT loan offer, retrofit certification program and energy efficiency savings calculator.

Bringing programs like the ones described in this paper to a larger scale will require multi-stakeholder collaboration and private investment, highlighting the need for coordinated stakeholder engagement and financing strategies. Utilities, banks and investors, tenant and ratepayer advocates, building owners, affordable housing developers and public utility commissions are all constituencies that have important roles to play in developing and supporting multifamily efficiency programs (Daniel 2012, Warner 2012). MPower Oregon provides a model in this regard given its partnerships between utilities, non-profits and CDFIs to manage and execute the program and leverage funding streams beyond utility ratepayer funds. As the Cambridge pilot gets off the ground, the City and NStar should similarly partner with mission-aligned investors and the finance community more broadly. In particular, banks and utilities can work together to provide credit enhancements and loan loss reserves via ratepayer funds. This will enable participating banks to ease their loan underwriting standards – thus increasing customer participation and encouraging private investment in energy efficiency – while also providing them with an additional layer of security for loan disbursement. Providing data on projected energy performance post-retrofit can also help create a value proposition for energy efficiency for banks and other lenders, spurring additional investment in multifamily programs.

The programs described in this paper are all relatively new (in the case of Cambridge the program has not even formally begun), but they all present creative approaches to unlocking the significant energy efficiency potential that exists in the multifamily sector. Energy efficiency advocates would be well advised to consider the examples of MPower Oregon, Solarize Massachusetts and the proposed Cambridge pilot as they develop new programs. They should also take strong measures to track and

evaluate the performance of both existing and new programs in the long term. Multifamily efficiency advocates have set ambitious goals, and they need to take care to ensure that their programmatic efforts can effectively respond to changing conditions on the ground and deliver on their substantial promise.

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