

Engaging Residents in Multi-family Building Retrofits to Reduce Consumption and Enhance Resident Satisfaction

Patricia Gee and Lucrezia Chiappetta

GreenRoots Strategies Inc.
104 Landing Drive, Chapel Hill, North Carolina
USA

Email: pgee@greenroots-strategies.com; lchiappetta@greenroots-strategies.com

Abstract:

The paper provides insights garnered from ground level practitioners in a 5-year tenant engagement effort of unprecedented scope and funding. The paper underscores the importance of meaningful tenant involvement to foster cooperation during energy retrofits, to increase the adoption of conservation behaviors, improve operation and maintenance of efficiency measures, and to promote tenant support for a broader green agenda. The authors discuss the program delivery challenges inherent in this intensive long-term approach and the potential to tailor cost-effective scalable models to have broader application in affordable housing venues. Program objectives related to tenant buy-in to the retrofit program, construction communications, joint tenant/staff decision-making, and conservation knowledge were achieved. The authors offer their and tenant participants' perspectives on the effectiveness of engagement strategies. They also stress the need for formal process and outcome evaluations, and impact data to document changes in actual tenant consumption practices to support future investment in these strategies.

Keywords: tenant engagement, behavior, social marketing

1 Introduction

As energy performance contracting to fund energy, water, and structural improvements has gained a foothold in North American social housing, the potential for enlisting residents as program partners has gained increasing attention and investment. From 2005 through 2010 the authors (GreenRoots Strategies) designed and delivered a tenant engagement (TE) and conservation training initiative that accompanied a 5-year \$90 million program of energy and renewal investments in close to 9,000 occupied apartments in 21 Toronto Canada social housing developments. The TE initiative was funded at approximately 1% of the overall construction costs. The energy retrofit and building renewal program was conducted by Ameresco, a leading energy services company, under contract to Toronto Community Housing.

It is the view of Toronto Community Housing that tenants bring to the table a unique perspective on their living environment. Several years prior to announcement of the BERP program, TCH had encouraged the participation of tenants in shaping housing policy and

had given them a voice on allocation of agency resources through a portfolio wide system of elected tenant representatives, tenant membership on the board, and a process for allocating some funding to local priorities voted on by tenants in each development. Consistent with this philosophy, TCH required that the BERP contractors accompany the installation of energy retrofits and renewal measures with an extensive tenant energy education and engagement program.

Ameresco's tenant engagement and training initiative, TeamWorks®, was characterized by shared decision-making and a high level of interaction with tenants, hands-on demonstrations of conservation practices, customized construction communications, peer-to-peer outreach and training, participation incentives and rewards, and an off-shoot youth environmental stewardship program with employment opportunities (not discussed in this paper). It drew upon principals of social marketing, adult education, and civic engagement.

Consumption impacts as a result of the behavioral intervention were not measured, given the difficulty and cost of calculating these in buildings receiving simultaneous system and structural retrofits.

2 Literature Review

Lower income residents use 28% more energy per square foot than higher income households, primarily because they live in older, less energy efficient dwellings. Increases in residential energy costs have outpaced income growth in low-income households, rising 33% on average since 1998¹. In Ontario, the province projects that electricity costs alone are expected to rise 3.5 per cent annually over the next 20 years, but 7.9 per cent over the next 5 years due to infrastructure investment needs.² In 2006, Ontario households in the lowest income quintile are more than twice as likely as the average income household to heat with electricity (27.0% compared to 12.9%).³ While Ontario renter households accounted for only 31 per cent of all households, they comprised 66.4 per cent of households in core housing need⁴.

To the extent that residents of affordable multifamily housing pay for their utility consumption directly, economic interest can be a strong motivating factor for adopting efficiency behaviors. For housing agencies already facing rising building maintenance costs due to aging buildings and reductions in public spending, the impact of paying both common area and unit utility costs certainly will be felt.

Studies show that up to 10% of building efficiency outcomes depend upon resident behavior⁵. Improved resident consumption behavior would achieve appreciable energy savings for space heating end-use.⁶ In multifamily rental housing, there can be institutional barriers to tenant participation, such as landlord-tenant mistrust, poor training and expertise of building staff and trades, and lack of monitoring, evaluation, and performance feedback.⁷

Community-based social marketing strategies employed to promote tenants' adoption of efficiency behaviors have shown to be effective, particularly when tenants see peers engaged, when incentives are offered, and when marketing messages are tailored based upon tenant values and interests. Use of trusted information channels and delivery of relevant information face-to-face by respected "experts" and/or peers increases the effectiveness of outreach efforts.⁸ Information on construction benefits of and instruction on how to use new measures are all critical as residents are often concerned that they will not know how to use energy saving equipment or that the retrofit technology will not work, and dread the disruption attendant with retrofit construction.⁹

Properly designed and delivered tenant engagement can go a long way in ensuring that tenants and building owners realize the desired benefits of energy efficiency retrofits.¹⁰ It also offers one of the best chances for long lasting sustainable behavior on the part of building occupants.¹¹ Residents are not typically consulted before energy efficiency measures are installed in their units; even though, tenant buy-in will very much depend on how involved residents feel that they have been in the decision making.¹² Tenants kept advised about construction throughout the BERP and consulted for their opinions expressed stronger support for the project (note following section on Ameresco's tenant survey).

Energy use in multifamily housing has long been identified as a particularly challenging area for energy conservation efforts. A majority of residents in low income housing do not pay individual energy bills based on usage. As a result, tenants have less incentive to

conserve energy because they cannot save money by reducing their individual use.¹³ In 2008, the Low-Income Energy Network (LIEN) estimated that just under a quarter of low-income tenants in Ontario were paying separately for utilities (i.e. hydro and heating). Furthermore, few tenants consider the environment and climate change as motivating factors for reducing energy consumption. While the environment does have importance among tenants, it is clearly not the tenants' first priority.¹⁴

3 Toronto Community Housing Case Study

Toronto Community Housing (TCH), Canada's largest provider of social housing, owns 58,000 rental units in a mixture of high, medium and low-rise apartment buildings, and single room occupancy group homes across Toronto. Reflecting the city's residential stock in general, the TCH portfolio contains a preponderance of high-rise residences, approximately 350 concrete buildings aged 30-40 years old that tend to be poorly insulated, in need of structural repair, and require envelope, water heating, space heating, and ventilation system upgrades. TCH estimates that it carries a backlog of \$650 million in needed improvements, despite having invested more than \$550 million in repairs between 2002 and 2007 (Toronto Community Housing website, October 21, 2011).

TCH is an independent, city-owned corporation that houses 164,000 low to moderate income tenants in subsidized rent-geared-to-income and market rate units. Tenants units include seniors, families, singles, refugees, recent immigrants to Canada and individuals with special physical or mental health needs. TCH residents represent 6% of Toronto's population and earn on average \$14,000 annually per household. Of their tenants, 25,000 are seniors; 65,000 residents are under the age of 25.

TCH reported in 2009 that energy, water and waste management represent approximately 23 per cent of their monthly operational outlay or \$119 million. (Toronto Community Housing website, October 21, 2011). The majority of tenants does not pay directly for energy use, nor receive feedback on per unit consumption. In 2008, the Low-Income Energy Network (LIEN) estimated that just under a quarter of low-income tenants in Ontario were paying separately for utilities for water and heating. It is estimated that 90 languages are spoken among TCH's incredibly diverse residents. In addition to providing affordable housing, the TCH mission is "to connect tenants to services and opportunities, and work together with tenants to build healthy communities" (Toronto Community Housing website, Mission Statement).

In 2005, TCH launched the Building Energy Retrofit Program (BERP), an ambitious program of building energy and renewal retrofits, in selected housing communities whose buildings represented the highest utility consumption and most urgent need for renewal

measures. Two energy services companies were selected to undertake the program, each of which would work exclusively in assigned housing communities.

Ameresco was awarded a contract to conduct the BERP program in 19 TCH developments comprising 30 mid to high-rise buildings and numerous low-rise structures with approximately 9,000 units (including a 2008 expansion of the program). The investment for energy retrofits, renewal investments, and tenant engagement totaled approximately \$90 million over the 5-year period. GreenRoots Strategies, Inc. was engaged by Ameresco to design and deliver a comprehensive tenant engagement and training program with multiple elements that included in its final year a peer energy advisor program.

The dearth of unoccupied affordable housing in TCH's property portfolio to which residents could relocate during the proposed major building retrofits required that tenants remain in residence during the construction. Retrofits of this magnitude involve frequent unit access, power and water shut-downs, and noise over an extended period and cause significant disruption and aggravation for tenants. The tenant engagement and training program had the added responsibility- beyond energy conservation education and training - for mediation of tenants' concerns about construction, tenant construction communications, and facilitating tenant decision-making around renewal measures and amenities.

Major retrofit measures were selected in advance, based upon investment grade audits and prioritization for the most urgent measures. They included hot water and heating boiler replacement, building automation system installations, riser repairs and replacements, installation of compact fluorescent lighting fixtures in suites, and retrofits to common area lighting, HVAC upgrades, balcony door replacements and window refurbishments, and building envelope repairs. Renewal measures included balcony slab and railing repairs, roof waterproofing, suite and common area upgrades, security upgrades, playground and landscape upgrades, and CO₂ monitoring.

3.1 TeamWorks©, Ameresco's Tenant Engagement Approach

TeamWorks gave tenants an opportunity to set priorities on a short list of measures identified in previous tenant surveys, to provide input on contractor practices to reduce inconvenience and disruption during construction, to review construction schedules which allowed tenants to gain an understanding of the construction process, and to receive energy conservation training and incentives to model energy conservation behavior among family members and fellow tenants.

In the introductory kick-off to the BERP, tenants in all participating communities were briefed at evening meetings on the major energy retrofits that would take place over the course of the next several years and advised of how this program would differ from any past experience tenants may have had with smaller TCH building retrofits, e.g. scope, dollar investment, and degree of tenant participation.

TeamWorks program elements included the following.

- tenant leadership opportunities (Community Design Teams)

- peer education and outreach (Green Team Energy Advisors)
- intensive tenant-trainer interaction based upon mutual respect
- tenant-designed guidelines for measures installers (embedded in installers' contracts)
- environmental education on sustainable practices
- tenant behavioral pledging to adopt efficiency practices
- tenant-friendly construction communications
- conservation prompts and promotional materials
- participation incentives and rewards
- facilitation of tenants' allocation of funding for local spending priorities (non-energy)

3.2 Staff Sensitivity Training and Communications Guidelines for Construction Sub-contractors

Early feedback both from staff and tenant leaders underscored the importance of the project personnel's ability to communicate with and treat tenants respectfully. Negative experiences with previous building improvement programs fostered a general distrust among tenants of anyone representing housing management, particularly relating to projects requiring entry into tenants' units.

As part of the effort to facilitate respectful communications with residents, TE trainers conducted a "sensitivity" workshop for Ameresco project coordinators. The session sought to dispel negative stereotypes about social housing residents, while presenting a realistic picture of the challenges staff would encounter working within the crowded inner-city housing buildings and with the ethnically and culturally diverse population.

With the input of tenants, Ameresco developed the Contractor Code of Conduct. The Code put forth a set of guidelines for sub-contractors on how to treat tenants with sensitivity and respect and was part of the sub-contractors' formal agreement. The Code addressed privacy and security issues, handling of tenants' questions and concerns, worksite clean-up, and care of tenants' belongings during installations within units. Repeated breaches in conduct resulted in reassignment of installation workers and warnings to contractors. On a positive note, contractors were also made aware when tenants acknowledged their exemplary performance.

The tenant engagement and training team included a former teacher and certified mediator, and personnel with social work training and field experience. One member of the training team had previously been a tenant services worker for TCH, and knew the communities and housing staff well. The TE team expanded later to include two part-time tenant hires.

3.3 Community Design Teams

In each development, "Community Design Teams" composed of tenants, TCH site staff and Ameresco trainers, were the structure through which tenants were provided leadership opportunities, received conservation education, engaged in joint decision-making with

housing staff about renewal measures, and were kept informed about retrofit construction. They also provided regular venues for tenants to ask questions and express concerns.

Team members were allowed to vote on a short list of additional measures which included community priorities such as: security systems, lobby and common space improvements, and playground equipment installations. Their input drove the selection of wall and carpet colours and other design considerations for non-energy renewal measures. Giving tenants an opportunity to vote on community priorities helped foster an early sense of ownership of the BERP program, as well as, created an increase in tenant acceptance of the retrofit measures that were pre-determined as priorities. The promise of regular construction updates meetings, continued involvement in decision-making, and tenant training further heightened tenant involvement.

Community Design Teams for each housing community met in evening sessions monthly initially and later bi-monthly. As needed, interpreters were present at meetings (including sign language). Culturally appropriate refreshments were provided, childcare offered, and (conservation related) raffle prizes awarded to encourage attendance. Meeting times were set to accommodate tenants' schedules; for example, the Team in a high-rise seniors building met mid-morning rather than in the evening.

During interim months, a smaller planning meeting was held with elected tenant representatives and/or community leaders for planning and problem solving sessions. This allowed program staff to stay attuned to any tenant concerns about construction and to engage tenant leaders more fully in design of community outreach activities.

At Design Team meetings, Ameresco engineering and construction management staff reviewed proposed project measures and installation status. To facilitate a better understanding of the different phases of construction measures, a graphic measures progress chart was designed and distributed at all bi-monthly meetings. The chart indicated the status of all measures scheduled for each year of the program. Charts were posted in common areas and on community bulletin boards where any tenants who were unable to attend regular meetings could view them. The use of the progress charts as well as the presence of project engineers at bi-monthly meetings reduced tenant questions and concerns regarding construction, ensuring that there was ample time to keep tenants focused on behaviour.

As a reward for participation, each Design Team received \$2,000 to \$4,500 to allocate to youth or general community activities (paid for directly by the TE staff). Funds paid for expenses like an air conditioner for a seniors activity room, youth field trips, Energy Hog Scavenger Hunts, playground dedications and community celebrations, barbeque grills, meeting room chairs and tables, girls group materials, recycling education, homework and afterschool programs, Energy Bingo games, decorations and food for holiday parties, mini-workshops on water and energy savings in laundry rooms, a dedication celebration with snacks for a renovated "activity" room.

The Teams co-sponsored with TE staff high-visibility events and outreach activities. These included: project “kick-off” celebrations, co-sponsorship of holiday celebrations, and educational outreach activities. During the first 3 months, Team members and engagement staff worked together to prepare a 12-month plan of action that was updated each year. For example, Teams organized community cook-outs to engage residents and to celebrate newly installed playgrounds.

Team members were encouraged to pledge to adoption of 1 to 2 conservation practices initially. It was intended to be an incremental pledging program with more pledged practices added over time and public display of participants’ names and pledges. Unfortunately, due to other program demands, incremental pledging activities fell by the wayside.

3.4 Environmental Education and Training

Interactive, participatory tenant education and conservation training workshops were held intermittently during bi-monthly Team meetings to provide hands-on experience with conservation practices and to enhance tenant roles as peer educators. Training workshops were casual and fun, offered with interpreters as necessary. Activities focused on major energy end-uses such as lighting, space heating and cooling, domestic hot water use, and plug loads.

Educational games and videos, PowerPoint presentations, and films geared for specific audiences were developed or purchased to accompany each educational component. In addition, based upon tenant interests, educational materials were created relating to sustainable practices apart from building energy or water consumption, such as source reduction and recycling, sustainable purchasing practices, composting, and use of green cleaning products.

3.5 Project Communications

Two weeks prior to Community Design Team meetings, meeting notices were displayed in building lobbies and beside the elevators on each floor. Later, due to the frequent takedown of these notices, trainers also mailed notices and agendas to tenants who regularly attended the bi-monthly Design Team meetings. Attendance and minutes were taken at each meeting, distributed to tenants and posted in the common areas. Tenants who attended three or more bi-monthly sessions were given resource binders and canvas bags to store educational materials, conservation pledges, meeting minutes and construction progress charts.

Trainers employed tailored messages and colourful graphic materials. Conservation messages were adapted based upon early interviews with tenant leaders, stressing improved comfort, reduced transfer of noxious odors from neighbors, healthy living, and, to a lesser extent, environmental stewardship.

The package of educational and promotional materials was tailored for each community based upon tenant demographics and linguistic requirements. All written program materials

were translated into the dominant languages spoken in each participating building, including Farsi, Somali, Chinese, Arabic, Spanish, Tamil, Bengali, French and Korean. Written materials were sent to housing staff for their review prior to distribution.

BERP bulletin boards set up in each community displayed community-specific program materials which were updated regularly. In addition to meeting notices and minutes and conservation prompts, photographs of Team members engaged in project activities were often displayed to underscore the participation of tenants and to promote interest.

Team members co-wrote with TE staff quarterly project newsletters for distribution to Team members TCH staff, and to be displayed at each site. Some Teams took over preparation of the newsletters. Newsletters were filled with photographs of engaged tenants, information on retrofit measures, conservation tips and educational games, and a “What’s Coming Up” section.

3.6 Green Team Resident Advisor Program

In the last 12 months of the program, Ameresco developed the Green Team Program which recruited particularly dedicated members of the Design Teams to serve as paid Green Team Resident Advisors among their peers, working an average of 6-8 hours a month. Resident Advisors participated in 3-day training on sustainable practices, as well as communication techniques, meeting facilitation, and community-based social marketing strategies. They conducted apartment energy audits, hosted light bulb exchanges, facilitated informational workshops and lobby intercepts, and addressed their neighbors’ questions about upcoming retrofit construction.

3.7 Engaging Building Maintenance Staff

Building maintenance personnel received on-site training for operation and maintenance of new equipment and renewed facility assets installed as part of the program. Tenant engagement staff created a display poster for the maintenance staff offices that provided tips on efficiency practices and ways to reward tenants’ conservation efforts. Maintenance staff received information on upcoming Design Team meetings, minutes, and progress charts/reports. In some cases, maintenance staff attended the Team minutes and addressed tenants’ questions and concerns about the measures being installed under the program.

4 Findings

A major challenge to undertaking extensive energy retrofits in occupied buildings is the upheaval during installation and renovation and resultant discomfort for tenants. Tenants who do not fully understand and embrace the energy related capital improvements to their buildings can undermine the savings and disrupt the retrofit process.

In July 2008, engagement staff surveyed 50 tenants who had participated regularly in the Community Design Team meetings. Comprised of 15 questions, the survey was designed to rate the tenants’ satisfaction with the engagement and information strategies, program impacts relating to building appearance and comfort level, as well as sub-contractor

behaviour, knowledge and practice of energy/water conservation, and the likelihood of participation in future environmental education training.

Tenants rated the tenant engagement initiative very favorably in terms of feeling respected as program partners, the level of program buy-in, and having received improved service by construction sub-contractors. Virtually all respondents thought that the Community Design Teams were a useful mechanism to facilitate tenant participation (92%). A large majority (85%) reported that it is very important to practice efficiency behaviour.

- 92% of tenants thought that working in teams was a useful strategy
- 86% felt that their feedback and ideas were listened to and respected
- 80% said that being able to vote on measures and amenities was important to them
- 88% of tenants found the measure updates and access to project engineers was useful
- 76% believed that the Contractor Code of Conduct resulted in improved service
- 85% of tenants believed that it is very important to practice energy and water efficiency
- 33% of the survey tenants wanted to become peer energy advisors

Tenants reported that they are doing more to save energy and water (39%) and now do more to conserve on lighting electricity use (37%). Objective evidence of changes in occupants' documented energy using behaviour as a result of the engagement program are not available.

A planned pre-intervention survey to establish a baseline on efficiency practices was never approved by TCH. As a result, it is impossible to know how tenants' responses about their conservation practices at the end of the program might have varied from those that would have been given in 2005. Lack of observational evidence of pre- and post-program energy practices and of consumption data that isolated changes due to behaviour from those resulting from system and building improvements, makes it impossible to gauge the accuracy of the self-reported behaviour. Given the 5-year term of the engagement and energy education activities, one can assume that the "baseline" on practice might have moved each year as the tenants gained more information and incrementally adopted (or not) conservation practices.

The absence of individual unit metering complicated the ability to isolate individual unit consumption, and thus to measure the impact of family level conservation behavior. A valuable feedback mechanism that could have promoted and rewarded tenants' adoption of conservation practices was lost. With utility costs included in subsidized rent, the message of the market was interrupted, resulting in tenants having fewer incentives to conserve energy and water.

Very close and productive relationships were established with the tenant members of the Community Design Teams (4-12 persons per site), who were often elected tenant representatives and informal leaders who were listened to and respected by their peers. The

Teams provided a venue for tenant input and allowed program staff to respond in real time to tenants' concerns and to acquire occupants' views on the performance of unit measures.

The tenant engagement program failed to achieve the desired level of intensive face-to-face interaction with the majority of residents, which could have facilitated adoption of conservation practices on a scale necessary for the greater consumption impacts. The responsibility for construction communications and complaint mediation --though critical -- greatly reduced the TE staff time available for community-based social marketing strategies.

5 Conclusions

Tenant reports and the authors' experience working with tenants during intensive program retrofits in occupied social housing support the authors' conclusion that program outcomes can be improved through the application of well-designed and delivered tenant engagement activities. The level of tenant buy-in during disruptive retrofits will depend on how involved and respected tenants feel they have been and the quality of construction communications.

TCH reported that the outcomes realized from engaging residents as part of the BERP went beyond additional energy savings. Joint decision-making with tenants, opportunities for peer teaching and leadership, and the ability for tenants to influence program design were essential. Tenant participation shaped and improved the BERP to an unprecedented degree. Better understanding, greater co-operation, and continuation of sustainable behaviours have heightened the success of the program.

The lack of hard data on the impacts of behavioral strategies argues that future engagements include a pre and post savings measurement component. Added to improvements in demonstrated buy-in of tenants and satisfaction with otherwise intrusive efficiency retrofits, this tenant engagement model is a compelling strategy for housing agencies.

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