Making it happen: Achieving energy efficiency in multi-family buildings housing low-income tenants

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Abstract

Saving energy in multi-family buildings is a comparatively easy task to accomplish in theory: Engineering science has shown us how to reduce heat loss and air infiltration, how to balance systems and improve heating plant efficiency, and how to capture warmth from the air, the earth and the sea. But getting this knowledge into multi-family buildings and making it energy efficient in fact is very difficult, especially if those buildings house low-income and elderly tenants, the people for whom saving energy is most urgent.

Energy practitioners have found that multi-family building owners are not buying energy efficiency because it is not being marketed intelligently; affordable financing is very difficult to obtain, and energy education tailored to the needs of owners, occupants and maintenance crews is practically unknown. This paper discusses how four non-profit energy companies, located in major cities, overcome these obstacles. It explains how they market energy conservation improvements, how they finance them, and how they involve tenants in energy education; i.e., how they make energy efficiency happen in multi-family buildings.

How do you achieve energy efficiency in multi-family buildings housing low-income and elderly tenants?

The Gordian Knot

For more than a decade, this deceptively simple question has perplexed and frustrated energy practitioners, researchers, policymakers, government officials, utility executives, and community activists in major municipalities all over the country. Each has approached the problem of energy conservation in multi-family buildings from the perspective of his or her particular profession, only to discover that relative probable effectiveness, warning investors against worthless devices, of which there are many. Consequently, although identical energy conservation measures were installed in identical multi-family buildings, each saved a significantly different percentage of energy.

This is not to say that research has been inconclusive. Both institutions have demonstrated that energy efficiency is a worthwhile investment, and they have been able to categorize the many energy investments the market according to relative probable effectiveness, warning investors against worthless devices, of which there are many. Policymakers have been similarly affected in their efforts to induce most landlords to invest in energy conservation. It is not to say that research has been inconclusive. Both institutions have demonstrated that energy efficiency is a worthwhile investment, and they have been able to categorize the many energy investments the market according to relative probable effectiveness, warning investors against worthless devices, of which there are many. Policymakers have been similarly affected in their efforts to induce most landlords to invest in energy conservation. It is not to say that research has been inconclusive. 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In the absence of national direction and guidance, local leaders in key cities around the country have designed and initiated a variety of programs directed toward turning multi-family buildings housing low-income and elderly tenants into energy efficient structures. One of the most effective such efforts has been the non-profit energy company, a relatively new institution as energy efficiency. At least half a dozen such companies were started in the early 1980s. Each attempts to cut the Gordian knot of energy inefficiency in multi-family buildings through a comprehensive approach, pooling the resources, knowledge, and support of a wide array of individuals and institutions, and offering building owners attractive financing, expertise in energy technology, and energy education.

This paper discusses four of these programs—Citizens Conservation Corporation in Boston, Community Energy Development Corporation in Philadelphia, the Energy Resource Center in St. Paul, and the Center for Neighborhood Technology in Chicago. Using these non-profits as subjects, the paper focuses on three non-technical areas: marketing, financing, and energy education. These are areas often overlooked when energy conservation is discussed in engineering circles, but they are, nevertheless, areas essential to the achievement of energy efficiency in multi-family buildings.

The paper's purpose is to share with the reader the lessons practitioners have learned through hard-won experience, to encourage others to undertake or support similar initiatives, and to contribute to the general understanding of local multi-family energy conservation efforts currently operating in four major cities. The information contained in the paper has been gathered through firsthand experience (the writer was vice president and general manager of Citizens Conservation Corporation from its inception in 1981 until June of 1984), and through the general cooperation of the directors of the other programs.

Marketing multi-family energy efficiency entails selling a program not only to building owners, but to sources of start-up capital and loan pools as well. Each of the non-profits discussed in this paper tailored their approach to marketing after first determining both the needs of the communities they serve and what would appeal to potential funders. The energy services organizations in Chicago, Boston, St. Paul, and Philadelphia, all began as pilot projects whose initial markets were defined by funding sources and demonstration concepts. The Center for Neighborhood Technology in Chicago initially provided energy services for nonprofit buildings, such as churches and YMCAs, and then, recognizing the need, sought and received funding from the Amoco Foundation and a consortium of local lenders, enabling it to offer reduced interest.
ment Corporation in Philadelphia, CNT sees job potential in Chicago, the effort is establishing eight satellite service centers in key low-income neighborhoods. Like the Community Energy Development Corporation in Philadelphia, CNT sees job development as an equally important community purpose. Their objectives are to save energy, conserve housing stock, and create jobs; purposes that attract financial support from government, utilities, and foundations. Both CNT and CEDC have created new job opportunities for neighborhood residents as energy technicians, installers, and support staff.

Citizen Conservation Corporation in Boston and Energy Resources Center in St. Paul, on the other hand, have developed programs emphasizing tenant involvement and innovative energy conservation technology. CCC, whose start-up funding came from the Holland Corporation, and Citizen Energy Corporation, and from Chevron Oil Overcharge Funds granted by the Massachusetts Energy Office, developed and tested a rebate concept that rewards the building owner and occupants for practicing energy conservation. CCC has experimented with this concept as well. Its funding comes from the local utility and city government.

SELLING ENERGY EFFICIENCY

One of the first discoveries made by practitioners from each of the programs under discussion was that multi-family building owners were not interested in buying energy efficiency. In fact, the phrase itself is enough to turn them away. They, or their colleagues, have had too many awful experiences with audits that project gigantic energy reductions, but which, upon close examination, turn out to be little more than computer number games; siding and storm window salesmen who have promised them huge fuel savings, only to disappear when the owner asks for the receipt. Sometimes, but not always, conducts heat; and energy management system that have managed to do little more than turn reasonable occupants into irate tenants.

What multi-family building owners are in the market for are the immediate benefits. A satisfied customer is by far the most effective and certainly the least expensive advertising media available. CCC has used this approach with considerable success in competitive where landlord associations are active, and in buildings financed by the Massachusetts Housing Finance Agency.

A second, inexpensive advertising technique is the news conference or "media event." Most programs hold a press conference when their first building is completed, or when they receive additional support from a funder. They find that these events are ideal opportunities to thank government, foundation, utility, and bank officials who support the program, and to legitimize the company in the public mind. Handouts describing the program and the measures installed in the building, listing the names and affiliations of invited guests, and summarizing the points the company wishes to make, are made available at the site and mailed to those media who fail to attend. Mass mailing has been used, somewhat successfully, by CEDC. This agency has found that a series of letters can elicit a genuine prospect response. Beginning companies, however, are usually content to use a "word-of-mouth" fund pool from marketing very extensively. Individuals and organizations that benefit from the program—tenants, auditors, contractors, neighborhood and city groups—also contribute effectively to marketing efforts. Activity usually alien to non-profit organization employees, is a skill these groups have mastered.

FINANCING

One of the major obstacles impeding the installation of energy conservation improvements in multi-family buildings, especially in lower-income communities, is the inflexibility and unaffordability of financing. No matter where building owners turn, impediments to energy conservation loans lay large before them. Nationally, the problem of inner city disinvestment continues to plague all property owners, interest rates remain prohibitive, and many banks avoid making small loans to multi-family building owners because of high transaction costs, concern over security, marginal cash flow problems, and general fears of default. In some neighborhoods, building owners are equally reluctant to deal with banks. While getting its program started in Boston's Roxbury

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Advising. Practitioners from non-profit organizations have learned that, as with most businesses, the best advertisement is a satisfied customer. Experience has demonstrated that one of the most successful approaches to marketing energy conservation in multi-family buildings has been to utilize what sociologists refer to as the conversion/dispersion approach. For simply, this marketing method entails locating a building owner who not only has a building that qualifies for the program, but who is also well-known in the community as a reputable individual and who is highly respected by his peers. The non-profit uses its efforts on selling the program to this particular owner, and then makes certain that all services are delivered with the utmost efficiency and consideration for family and tenants. The aim is to turn the client into a "convert," not just a customer. The convert is then inclined to sell his or her peers on the company. This begins a "word-of-mouth" campaign which is by far the most effective and certainly the least expensive advertising media available. CCC has used this approach with considerable success in competitive where landlord associations are active, and in buildings financed by the Massachusetts Housing Finance Agency.

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section, for example, Citizens Conservation Cor-
poration found itself working with owner-occupants
who had never borrowed money from a traditional
leasing institution and who have never estab-
lished a credit history. They commonly acquire
property through "contracts for deeds" or "con-
tract purchases"; i.e., financing provided by the
seller; or they had inherited the building.
Such owners do not understand or are suspicious
of traditional mortgage financing--the variable
rates, points, and closing costs--and use bankers
as outsiders concerned exclusively with risk-free
investments. Consequently, CCC spent a great deal
of its staff time leading these owners by the hand
through the loan application process.

The Rushbury experience may be a problem that
is unique to the most severely depressed com-
nunities. However, even those building owners who
have historically borrowed money from traditional
leasing institutions, and who have established
sound credit histories, find interest rates and loan
requirements, such as first mortgages or 50 per-
cent equity, will squelch the most promising
investment.

The programs examined in this paper have
succeeded in at least partially bridging this gulf
in the communities they serve by forming loan
pools featuring reduced interest rates, liberal
underwriting criteria, and reasonable security
requirements, and by taking advantage of state
and federal government loan guarantee programs.

LOAN POOL SOURCES

St. Paul's Energy Resource Center, and the
Community Service Corporation in Philadelphia have
tapped foundation grants to start revolving loan funds. ERC received a grant from the Minnesotta-St. Paul Housing Fund; CEDC received similar funds from the Community Devel-
lopment Corporation. As a result, CEDC now has a $15 million
loan pool--The Chicago Energy Savers Fund--con-
ducted by two local utilities, Northern
Utilities and Commonwealth Edison, at 9 percent, which in turn is subsidized down to
5 percent with oil overcharge funds from the state
energy office. Most buildings financed through the
CHDC/PCA program are large, containing more than
100 units, and receive energy conservation improve-
ments costing up to a total of $150,000 per apart-
ment complex.

Like marketing, developing or tapping into
existing loan pools to finance energy conservation
improvements in multi-family buildings is a task
that requires a knowledge of locally available
resources and an ability to negotiate with a
variety of resources. As suggested above, loan pools have been estab-
lished that are unique to each community. In some
cases new loan pools have been created where none
existed; in other instances, loan funds or sub-
sidies (viz., the Solar Energy and Energy Conser-
vation Bank) were available, and the program developer was able to tap into these resources
on behalf of its particular clientele.

ENERGY EDUCATION

Human understanding and behavior are the most
important determinants in energy use. This truism
is universally acknowledged. Yet the total invest-
ment in effective energy education and behavior
modification research and implementation is miniscule when compared to public and private sup-
port for physical energy conservation improvements
in residential buildings, both multi- and single-
family.

Utility companies, through the Residential
Energy Conservation Service, have invested millions
of rate-payer dollars in energy "audits" intended
to guide homeowners' private investment in insul-
There are, of course, multiple explanations for this shortfall: Residential Conservation Service audits, and other backdoor projections, notoriously overestimate post-retrofit consumption; energy prices have stabilized, lessening the financial imperative to save energy, and some energy-saving devices, it has been discovered, simply don't work.

The non-profit energy companies discussed in this paper agree, however, that the most important single explanation is the lack of human understanding and informed behavior. Old habits are hard to break, especially when you don't know what they are. Large investments in storm windows are rendered valueless when building occupants leave them open in the dead of winter; expensive, high-efficiency boilers become a liability when building owners or their superintendents don't know how to operate or maintain them; attic insulation or flute dampers are a waste of money if contractors don't know how to install them properly.

Multi-family energy programs encounter such energy-wasteful habits and knowledge gaps every day. An expensive, high-efficiency boiler installed in an apartment complex by the Energy Resources Center in St. Paul was nearly destroyed, and the building set afire, because the owner either neglected or did not know how to put water in the system. A flue damper improperly installed in an apartment building in Boston caused a significant increase in fuel consumption, rather than an energy savings. And every building owner has experienced the frustration of seeing storm windows wide open in 20° below zero weather.

Regardless of this frustration, and the need for energy education, has been clearly expressed by John Rasmussen, an Energy Engineer, who worked with more than 30 buildings and hundreds of tenants through Citizens Conservation Corporation's programs. Summing up his experience after three years of intensive activity, John wrote in a long refresher letter:

"I feel that the most important element of a good tenant education is education. You just can't get away from the need to modify people's behavior. Behavior is unpredictable and therefore to some twisted people, more fun to deal with; but if you ever want to effect real, enduring conservation, people's habits will have to be changed.

"Tenants make a convincing argument; one which non-profit energy companies accept as valid. But developing the capacity to train owners, residents, maintenance crews, and contractors in energy education requires skills and resources not easily acquired. In spite of limited resources, Citizens Conservation Corporation and the Center for Neighborhood Technology have begun to develop programs in energy management training for building owners and custodians, which are tailored to individual buildings.

All the programs in this paper emphasize the importance of tenant cooperation in the energy saving process. CCC has experimented with a building occupants'energy education program for four years. From this experience, CCC has concluded that a successful energy education program for tenants has five elements:

Tenant/Landlord Cooperation. If the building owner and occupants are not on civil terms (as sometimes is the case), a campaign which asks tenants to cooperate by placing a check next to the word "Yes" from the start. In fact, fuel savings which might accrue a financial benefit to the owner will be intentionally avoided. One of CCC's most disappointing experiences was in a building where the owner attempted to raise rents sharply, but was not permitted to do so by the Rent Control Board. No amount of education or persuasion could induce these tenants to reduce their energy consumption.

To gain tenant cooperation, non-profit programs have found it beneficial to establish a dialogue with them from the first day of a project. Both CCC and the Energy Resources Center interview tenants during the audit of building energy study, asking them about their comfort concerns, and for suggestions. This approach not only helps to encourage owner/occupant cooperation, it also helps the engineers identify each building's energy usage patterns.

Feedback. Tenants, like homeowners, need to know how they are doing, and feel that someone cares about their comfort. Programs that do not include feedback, preferably monthly, are usually found to be cost-ineffective. In a 320-unit all-electric highrise in which Citizens Conservation Corporation installed a check-metering system that provided monthly printouts showing energy use in each apartment, energy savings paid for the $30,000 installation in two years. Once the tenants knew what to do and how to do it, behavioral patterns changed from wasteful to efficient.

Refresher Courses and Motivational Campaigns. It takes time and encouragement to change habits. Additionally, tenant turnover requires non-profits to return to buildings, at least once a year, to give refresher courses. During refresher courses, tenants are praised when they have saved energy and encouraged to make their own suggestions regarding energy saving. CCC has contemplated awarding certificates, buttons, gold stars, whatever works. People, including tenants,
are motivated by public recognition. Cash Incentives. People are also motivated by rewards. CCC has found that cash incentives are helpful in motivating energy conservation. However, without an ability to tie the rebate to specific savings in each apartment, they are sometimes viewed by building owners, and occasionally by tenants, as unearned windfalls. This is especially true in smaller buildings where the owner has observed open windows in the winter. Consequently, CCC altered its program for small buildings: instead of dividing the extra energy savings among all tenants, as was the original policy, the “rebate” was reinvested in a comfort improvement selected by the tenants as a group. This practice satisfies the landlord, whose building is improved, and enhances resident living conditions.

Capable Educators. Not the least of the essential elements of a tenant education program is the teachers. This is particularly true in buildings housing low-income, elderly, and minority renters. Some of the qualities of a capable educator are:

1. an understanding and appreciation of the students’ culture, concerns, and needs. Too often, energy “experts” convey an overbearing sense of superiority which may be interpreted by tenants of a lack of respect for their race or circumstances. Such a posture inevitably results in hostility and a refusal to learn.

2. An ability to explain energy use and how it affects rents or utility bills in language laymen understand. Practitioners have found that esoteric terms such as U or R values, balance points, and heat loss recovery are gobbledegook to those not schooled in energy conservation and may be to those who are. Needless to say, educators should be fluent in the tenants’ native language; this not only enhances communication, it reinforces the sense of respect for the student, which is vital to any educational program.

3. Enthusiasm. Simply handing out the brochures or showing movies, videos, and slides is a poor excuse for education. Students must be engaged. This is achieved when they sense the educator’s personal commitment to the subject. If the teacher is infected with concern for energy conservation, comfort, and landlord/tenant cooperation, the tenants will catch it.

CONCLUSION

There is no single, simple solution to the problem of energy inefficiency in multi-family buildings housing low-income and elderly tenants. However, non-profit energy companies in half a dozen major cities have devised comprehensive delivery systems capable of surmounting many of the obstacles that impeded progress in this field. Powered by more than mere profit motive, these companies are able to address the human as well as the technical issues involved in saving energy. This paper has discussed non-profit energy companies in Boston, Philadelphia, Chicago, and St. Paul, focusing on their successful multi-family marketing, financing and energy education strategies, and sharing with the reader the lessons they have learned over the past five years.

Needless to say, the learning goes on. Citizens Conservation Corporation, Community Energy Development Corporation, the Center for Neighborhood Technology, and the Energy Resources Center continue to test new ideas and seek new ways to turn waste-ful multi-family buildings into energy efficient, comfortable homes for their low-income and elderly residents. In addition to the work they have done in marketing, financing and energy education, they have made important breakthroughs in the applied sciences of energy auditing, retrofit technology, and construction management. Further, they are developing internal management and accounting systems that improve efficiency and enhance job satisfaction.

In February these non-profit energy companies were joined at a three-day conference in Philadelphia by more than sixty energy conservation practitioners from eleven states. At the conclusion of the intensive workshops, they agreed to form a practitioners association dedicated to the improvement of their own skills and knowledge through information sharing and staff exchanges, and to the establishment of additional multi-family energy conservation programs in communities where none now exist. To this end, an informal association called Energy Practitioners Exchange (EPE) has been formed. A Handbook for Practitioners in Multi-Family Energy Conservation is being written, and EPE members are establishing conferences in major metropolitan areas for utilities and government. Anyone interested in EPE and its activities should contact the writer for more information.