SEVEN KEYS TO ENERGY CONSERVATION IN MULTI-FAMILY BUILDINGS: CITIZENS CONSERVATION CORPORATION'S APPROACH TO ENERGY CONSERVATION IN MULTI-FAMILY BUILDINGS HOUSING LOW-INCOME AND ELDERLY RESIDENTS

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ABSTRACT

Since its establishment in August of 1981, Citizens Conservation Corporation, a Massachusetts non-profit energy services company, has sought to lessen the burden of high space heating costs on low-income apartment dwellers. A secondary purpose has been to design a model non-profit business that can be replicated by other governments, utilities, and organizations. To achieve these purposes, CCC has developed a multi-faceted approach to energy conservation, including building-specific audits, tenant participation, financing, construction supervision, energy savings guarantees, and fuel consumption monitoring.

Over the past three years, CCC has tested its approach by making energy conservation improvements in dozens of buildings of various sizes and descriptions and, in the process, has radically changed its original program design, has developed new financing techniques, and has organized a state-wide services capability.

CCC's experience demonstrates that a non-profit business approach to energy conservation in multi-family buildings housing low-income and elderly families can succeed: improvements averaging $1050 per unit can pay for themselves in energy savings over a five to seven year period; tenants can be persuaded to participate in an energy conservation effort when given the right incentives and feedback, and fuel use reduction can be guaranteed when audits are building-specific and consumption is carefully monitored. CCC's experience also shows that, in addition to energy conservation know-how and an ability to work with low-income people to improve their living conditions, low-interest financing and a strong administration and development component are essential to success.
INTRODUCTION

Achieving significant and lasting energy savings in apartment buildings housing low-income and elderly residents requires a variety of services, including building-specific energy audits, financing, marketing, construction supervision, fuel consumption monitoring, and energy conservation education. In short, it requires the establishment of a unique hybrid — a non-profit business that sells energy conservation and serves the poor. This is the thesis upon which Citizens Conservation Corporation was founded. It assumes that a non-profit organization can adopt the methods and disciplines of for-profit business and use them to meet a social need.

Like for-profit energy services companies, CCC sells a product: energy conservation. And like oil dealers or utilities, CCC must do business to survive. Unlike private, for-profit energy services companies, however, CCC does not seek out the most lucrative market in which to do business; it seeks out the most difficult—the poverty community. And unlike its counterparts, CCC does not measure its success by maximizing profits. Although operating in the black is essential to CCC’s survival, that is not its sole purpose. CCC’s primary purpose is to lessen the burden of high energy costs on low-income people; its success is measured by the number of families served and the amount of energy saved.

Since its inception three years ago, CCC has been responsible for the investment of more than $2,000,000 in energy efficiency improvements in some 65 apartment buildings. The buildings range in size from three unit "triple deckers" to 400 unit complexes. To date, a total of 2437 units have been or are in the process of being improved at an average cost of $1050 per unit. Energy use reduction in all buildings completed thus far averages 35 percent.

The purpose of this paper is to share with the reader some of the lessons CCC has learned over the past three years and to encourage the replication of the CCC model. A few words of caution at the outset, however, are appropriate.

First, the reader should bear in mind that the writer has been responsible for the development and day-to-day administration of CCC since its inception in August 1981; he has a personal commitment to the success of CCC which does not permit detachment. This fact makes it difficult, if not impossible, to present an objective, disinterested view of CCC’s operation.

Second, the reader should realize that CCC was not established as an experiment designed to test theories; it was set up to meet an enormous need not being met by government or private enterprise. Consequently, the methods and approaches used by CCC have been continuously revised. Whenever it became apparent, for example, that a particular energy audit procedure did not accurately predict savings, it was discarded, and whenever employees or outside firms were found to be unreliable, they were let go. New approaches and better qualified staff were then found, and the push to achieve CCC’s objectives was renewed. CCC had no intention of performing an experiment to determine whether or not a non-profit energy services company could succeed; CCC's intent is and always has been to make it succeed.
Finally, the reader should be aware that one of CCC's purposes is to become a self-supporting non-profit business that does not rely on government or foundation grants for its continued operation. This purpose places constraints and demands on CCC that are not characteristic of a typical non-profit organization.

CCC staff must be production oriented. Getting conservation improvements completed in buildings efficiently and cost-effectively is a paramount concern. Knowing how to sell a product, as opposed to giving away a benefit, is another skill CCC employees must possess. Making and securing loans, negotiating legal agreements, tracking billable hours — these requirements and procedures are the nuts and bolts of CCC's operations, requirements not commonly found in the day-to-day operations of most non-profit organizations, yet essential to CCC's ability to achieve its goals. CCC staff must be able to understand and operate in the world of business.

At the same time, however, CCC staff must share the social concerns and commitment of the poverty community organizer, and the sensitivity of the legal services attorney. High energy costs are only one of the problems confronting the impoverished. To be insensitive to the ramifications of racism, or to be impatient with foreign born's language barrier, is to invite misunderstanding and ill-will. These aspects of CCC — the nuts and bolts of the business and the social mission — are not dwelt on in this paper, but should be kept in mind as the reader learns about the CCC mechanism.

PROGRAM DESCRIPTION

Citizens Conservation Corporation was established to overcome the disincentives to energy conservation experienced by landlords and tenants. The tendency to pass fuel cost increases along to tenants, unfavorable tax laws, the cost of credit, and the problems associated with learning the intricacies of conservation and supervising building modifications are disincentives discouraging multi-family building owners' investment in energy conservation. At the same time, tenants are disinclined to invest in property they don't own or to practice energy conserving behavior when the cost of fuel is hidden in their rent.

To overcome these disincentives, CCC developed a five step program of: energy audits, financing, loan guarantees, installation supervision, conservation education, and tenant rebates. The principal incentive to owners is that the program is designed so that his or her total annual costs during the five to seven year payback of a loan for the conservation modifications, including fuel costs, will be equal to, or less than, what annual costs for fuel alone would have continued to be without the conservation measures. Following the payback period, the owner enjoys sharply reduced energy costs and has a considerably improved building.

The principal incentive to tenants to practice energy saving behavior in a participating building (by not leaving windows open during the winter or air conditioners on in unoccupied apartments in the summer) is the "tenant rebate." When energy savings exceed the amount required to repay the loan and pay fuel costs, the excess is distributed to the tenants and the landlord.
Funds for the initial pilot project were provided by Citizens Energy Corporation, a non-profit oil company. Half the original grant - $50,000 -- was deposited in an interest-bearing account at a local bank and used to reduce interest rates on loans from 18 to 13 percent, and to secure the obligations of the building owners. Most of the remaining $50,000 was paid to a consulting firm to design and test the original program concept.

After candidate buildings were selected and owners persuaded to participate in the program, the bank checked their credit, approved the loan, and paid out funds in accordance with standard banking practices. The bank then collected monthly payments from the owner equivalent to his or her fuel costs, budgeted over a 12-month period. From these payments, the bank made the monthly loan payment and paid fuel dealers. Any funds left over were deposited in a "rebate account" and periodically distributed among the owners and tenants. When funds were insufficient to pay the loan obligation and the fuel bill, CCC returned to the building at no cost to the owner to determine causes and to make corrective measures. Frequent instances of this situation in the early days of the program led to fundamental changes in the design, which are described in the following sections of this paper.

PROGRAM GROWTH AND GOVERNMENT INVOLVEMENT

CCC was established as a loan program, not as a grant program, for several reasons:

First, it was recognized that the need for energy conservation in apartment buildings housing low-income and elderly residents was so vast, it was highly unlikely the government would ever appropriate sufficient funds to meet it. By loaning funds, rather than giving them away, CCC is able to stretch energy conservation dollars six to ten times further than a grant program. Although CCC has not yet experienced a loan default, it has postulated a 15 percent loss ratio each time the funds are recycled and has determined that, from the original $300,000 loan pool, the improvement of more than 2500 apartments will be possible. If the funds had been given as grants, only 300 apartments would have been improved.

Secondly, even if sufficient funds were available to meet the need, the advisability of making grants to commercial property owners is dubious from both a practical and a political standpoint. Practically speaking, grant programs tend to be controlled by the bureaucratic decision making process, which traditionally pre-determines the types of expenditures to be made regardless of building needs. Storm windows, new burners or boiler tune-ups, and attic insulation are the bureaucrats' favorite energy conservation improvements. Frequently, these improvements are not the best energy conservation investment for a particular building. Politically, large give-away programs arouse the ire of those who do not qualify or who are not reached by limited funds.

A loan program, on the other hand, which guarantees that the energy savings will repay the investment during a specific term, places the appropriate burdens of responsibility on the administering agency and the building owners. It builds into the whole CCC mechanism an accountability that demands reliable energy audits, carefully supervised construction, and conscientious monitoring. It also requires the building owner to become an active participant in the effort to save energy. These are the program characteristics CCC believed would be attractive to government and utilities, prompting the investment of additional loan funds and permitting CCC to expand and support itself through fees for services.
From the broad perspective, over the past three years CCC has exceeded the expansion objectives set forth in its initial plans. From its modest beginnings as a $100,000 pilot project funded by Citizens Energy Corporation, and struggling to save energy in two 5-unit buildings in the Roxbury section of Boston, CCC has developed into a multi-faceted business serving hundreds of building owners and tenants in cities and towns across Massachusetts.

The financial support that has made this expansion possible has come from state agencies and a local utility. Shortly after CCC's incorporation, the Massachusetts Office of Energy Resources allocated $312,000 in Chevron Oil Overcharge funds to the Program. Approximately 25 percent of these funds ($82,000) were used to capitalize the expansion of CCC's staff and service area. The remaining $230,000 was deposited in the revolving loan fund to guarantee and reduce interest on loans to building owners. Then, in 1983, the Massachusetts Housing Finance Agency committed a $1,000,000 loan pool to a CCC/MHFA energy conservation program designed to reach 1,000 units in 8 to 10 large apartment complexes. Loans are made to MHFA financial buildings and are repaid over five years from the energy savings. Later in the same year, Bay State Gas Company, which serves three separate geographic areas in the northern, southern, and western sections of Massachusetts, granted CCC $688,000 from its Louisiana First Use Tax Refund for interest loans to gas heated apartment buildings. Ten percent of this fund has been used for staff expansion and training; the remaining amount is loaned by CCC to building owners at 50 percent of the prime interest rate. All of the approximately $2,000,000 loan fund has been committed to specific buildings. The loan fund has been further increased by more than $150,000 through earned interest, recycled loans, and the sale of buildings in CCC's portfolio. These funds are also being committed to additional buildings.

LANDLORD RESPONSE

Marketing the first key component of CCC's approach to energy conservation, also appears to have achieved success with few (albeit important) exceptions. A survey of the first 30 building owners to participate in the program conducted by an outside consultant elicited numerous unsolicited endorsements and no major complaints.

The program was not an immediate success, however. Many building owners were initially reluctant to participate, due largely to the uniqueness of the concept, a distrust of "energy audits," and to a healthy skepticism of the home improvement industry. It takes time and a lot of hard work to build a reputation. After three years, CCC has proven that the program's basic premise is sound: energy efficiency improvements can pay for themselves in fuel savings. Building owners have also found that this sort of capital-free investment will significantly increase the value of their property, enhance tenant comfort, and, in those cases where the residents pay their own fuel bills, reduce tenant turnover and utility shut-offs.

Other inducements to building owner participation are the reduced interest rates (5 to 12.5 percent, depending on the loan fund and type of building), and the additional services CCC provides: energy conservation expertise, construction supervision, and loan arrangement.

Few building owners possess an in-depth knowledge of energy technology. Because CCC's interest is to achieve energy savings, not to sell particular products, they can place their confidence in CCC's energy conservation recommendations.
CCC's construction management acts as a further inducement to owners. All property owners are familiar with the hassles involved in getting contractors to complete work on time and in a satisfactory manner. By undertaking this task, CCC relieves the building owner of enormous headaches.

Finally, many building owners, especially owner-occupants in poverty neighborhoods, have never before dealt with a bank and are understandably suspicious of banking practices. In those instances requiring bank participation, CCC has guided the building owner through the loan application and closing process. In many instances, this assistance has helped several landlords extricate themselves from poverty conditions. Because fuel bills in low-income rental properties are often out of control, owners cannot collect enough rent to pay them, experience shut offs and lose tenants. From that point on, conditions worsen, pipes freeze, and property is abandoned. CCC's aid prevents this from happening.

When selling energy conservation, engineers must be very sensitive to the building owner's needs and listen to his or her ideas. Most lost sales are lost because the engineers think only about energy conservation, not about tenant comfort or the building owner's special concerns. For example, building owners often want to replace boilers, not only to reduce fuel costs, but to cut maintenance expenses as well. These concerns must be taken into consideration and trade-offs negotiated. The unvarnished truth of the matter is, ultimately, that building owners don't care about energy conservation per se, they are interested in saving money and earning money. Specifically, they want to reduce tenant turnover and expenditures, and increase the value of their property. A marketing effort that does not recognize and respond to these interests will fail.

TENANT PARTICIPATION

It can be safely said that CCC's program combines services, guarantees, and access to financial assistance sufficient to overcome the intelligent building owner's disinclination to make substantial energy conservation improvements in his or her multi-family building. The incentives to tenants to practice energy conservation in these buildings are less obvious and much more difficult to measure. CCC's Tenant Education Program is the second key element of its approach to energy conservation in multi-family buildings. Through Tenant Education, CCC teaches building residents specific ways to reduce energy and offers cash incentives to do so. The incentives vary according to the particular characteristics of the building. In participating buildings, CCC is dealing with essentially three different sets of circumstances that affect tenants financially: centrally heated, unmetered units in which the tenants' fuel costs are included in their rent; individually heated or metered apartments where tenants pay their own fuel bills, and centrally heated units that are "check-metered."

An assumption implicit in the original program design is that CCC's project was geared exclusively to centrally heated buildings in which fuel costs are included in the rent. The initial program design did not take into consideration the fact that many apartment buildings are not centrally heated, yet they are equally in need of energy conservation improvements. Upon recognition of this fact, CCC modified its program and now serves both centrally heated and individually heated units. Of the total buildings served thus far, approximately 30 percent are individually heated units in which the tenant is responsible for the fuel bill. In these buildings, tenants experience an immediate reduction in fuel costs following the installation of
energy conservation improvements, and CCC's tenant education is taken very seriously. Tenant and building owner reaction has been very positive, both in terms of reduced fuel use and increased occupant comfort.

In buildings that are centrally heated and unmetered, it is impossible to establish a direct relationship between tenant behavior, rebates and energy savings. In fact, spot checks of these buildings over the past two winters suggest that there may be no relationship at all.

To date, CCC has distributed about $3000 in rebates among approximately 150 tenants in six buildings. The largest amount given to a single tenant is $180; the lowest rebate, $5.80. More than half of these rebates were distributed in centrally heated, unmetered buildings. The amount of the rebate was determined by simply dividing excess savings among the building residents either in equal amounts to all tenants or according to the square footage of their apartments. In either case, two tenants in the same building with the same size apartment received equal rebates regardless of energy conservation behavior. In some cases, CCC suspects that the energy improvements were more cost-effective than originally projected and tenants receiving rebates are merely the passive beneficiaries of this happy circumstance. They received cash rebates whether or not they saved energy.

Interestingly, tenants do not appear to be particularly concerned about the rebates, and in two buildings they have chosen to spend the excess savings on further energy improvements, rather than take the cash. Comfortable living conditions seem to be more important to building residents than a periodic bonus for "good energy conservation behavior" (whether earned or not) from CCC.

In an attempt to develop a more direct relationship between tenant behavior and energy savings, CCC installed a check-metering system in a 132 unit elderly high rise, which is centrally metered and heated by electric resistance heaters. The system measures the kilowatts used in each apartment and in the common areas; usage is printed out by a mini computer at the end of each billing period. In this building, CCC established an "energy allowance" for each apartment and distributes rebates only to those tenants who use less than their allowance. The rebate is directly proportionate to the amount of energy saved. The tenants who use more than their allowance receive nothing. The meters have been in operation for nine months. During this period, CCC has witnessed a measured reduction in energy use each month in most of the apartments. This reduction suggests that CCC's tenant education program, coupled with cash rebates and hard data informing tenants of the actual electric usage in their apartments will tend to shape positive energy conservation behavior.

The check-meters have other energy saving qualities as well. By reviewing the meter readings monthly, CCC is able to spot energy wasting fixtures or malfunctioning appliances, and, working with building management, have them repaired or replaced. The check-meters also permit CCC to establish equitable energy allowances for each apartment. Apartments with greater exposure to high winds and cold weather are given more generous allowances than those with only one exterior wall facing south. Finally, the building owner and the tenants are able to benefit from bulk utility rates. In contrast, in buildings where the owners have converted centrally metered gas or electricity to individually metered utilities billed to the tenants, building residents have experienced a 30 to 40 percent increase in cost per measured unit, which has more than offset
the financial savings gained through energy conservation improvements and behavior.

The more or less arbitrary disbursement of rebates among tenants in non-check-metered buildings is one aspect of the CCC program that is not popular with building owners. They reason that excess savings belong to them and that they should determine how they are spent. In fact, several of the more sophisticated building owners and managers have refused to participate in the program simply because they find the rebate concept unacceptable. One owner, for which CCC improved 50 units and achieved savings in excess of 50 percent of historic usage, has refinanced his loan at commercial rates to avoid rebate payments.

Although the tenant rebate in non-check-metered buildings is of questionable effect insofar as energy conservation behavior is concerned, the effect of the physical improvements on tenant comfort is indisputable. Tenant after tenant has commented on the improvement of their living conditions following CCC retrofits. Increased comfort, plus a knowledge that energy costs, which affect rents, are being contained, appears to be ample incentive to most tenants to practice energy conservation.

ENERGY CONSERVATION TECHNOLOGY

The backbone of any business is the product it produces. An energy services company produces energy savings. Ultimately, this is what building owners buy. The Tenant Rebate caught the media's attention, and gave CCC’s program a unique twist, but it did not sell building owners. Reduced interest loans make the program more attractive, because paybacks on improvements are faster and because everybody hates inflated interest rates; but if you can't get significant savings in a building, you've got nothing to sell no matter how attractive the interest rates. Getting savings through physical improvements is the third key component of CCC's approach to energy conservation and the most difficult part of the business.

When CCC got started in 1981, it assumed that the "energy experts" (i.e. the established public and private energy auditing firms) could handle that end of the business. This proved to be a near fatal assumption. CCC soon discovered that the "experts"' conception of how to save energy in multi-family buildings was untested and unreliable. As indicated in the program description, CCC originally retained consultants to perform energy audits on candidate buildings, to determine the potential energy savings achievable by specific conservation measures, and to establish current and projected fuel costs. This procedure was followed for the first year of CCC’s program. Four different firms, including the state's RCS organization, were tried. Many of the "audits" provided CCC by the consultants, particularly the RCS and other computer program approaches, were so obviously unreliable they were thrown out prior to implementation. In every case where "canned" audit recommendations were implemented, the buildings failed to achieve projected savings. Paybacks on specific measures were exaggerated; some recommended improvements, such as flue dampers, had already been shown to be ineffective under certain conditions; the idiosyncrasies of particular buildings were not taken into consideration, and errors in simple arithmetic were frequently made. It soon became apparent to CCC that to guarantee savings based on these audits was foolhardy.
It also became apparent to CCC that an energy services company had a continuing obligation to a building owner which was not shared by outside consultants. Not only must the savings be achieved, they must be maintained. CCC fired the consultants and began the slow, self-educational process of hiring and training its own staff of energy engineers and construction supervisors who are accountable for their audit projections and for the effectiveness of the installed measures. This approach to delivering the product — energy savings — has been largely successful. Ninety percent of the buildings improved under this in-house arrangement have achieved or surpassed the projected savings.

Through the staff development process, CCC learned that energy conservation in multi-family buildings requires a constantly updated knowledge of energy efficiency products and a building-specific approach to the audit itself. The "quick and dirty" automated audit may make lots of money for the auditing firms, but it is nothing but trouble for an energy services company. CCC's engineers must follow a detailed outline during the audit and examine every aspect of the facility. Air infiltration tests are conducted on sample apartments, the building's idiosyncrasies are searched out and, during the writing of the audit report, the interaction of measures are carefully calculated.

Energy engineers must also understand that the conventional wisdom of heat loss calculations derived from ASHRAE standards may be valid in commercial and industrial buildings, but they do not apply to multi-family structures. Further, the assumption that there is a need and a demand in residences for space heat when the outside temperature drops below 65 degrees Fahrenheit may have been true in the 1930s, when the concept of Heating Degree Days was developed, but it is no longer valid. Because buildings constructed since 1930 are generally more weathertight, and internal gains from modern appliances are much greater than they were 50 years ago, furnaces usually don't kick on until the outside temperature drops well into the 50s. Failure to take these facts into consideration may be the single most common cause of exaggerated payback projections for certain conservation measures such as storm windows and attic insulation.

Keeping up-to-date with current products is the one aspect of energy conservation that engineers seem to enjoy most. For this, if for no other reason, they need to have a non-technical person looking over their shoulder. The temptation for them to try out the latest "black box" on some unsuspecting apartment building owner and his tenants is greater than most engineers can resist. This is another lesson CCC learned the hard way.

In 1983, CCC was persuaded by its chief engineer to install a submersible heat pump 500 feet into the ground at a 37 unit apartment building to supply domestic hot water. The system was to replace six 120 gallon tanks with electrical resistance coils. The electric bill for these tanks and five rent-controlled apartments averaged $1,600 per month. The Coefficient of Performance following the installation of the submersible heat pump was supposed to be three. After spending endless hours hassling with the manufacturer, re-piping and re-wiring the heat pump, and installing "back-up" coils in the water storage tanks, the building owner's electric bill is now averaging $1,900 per month, and the cause of this failure is yet to be determined.
This does not mean, however, that all innovations are to be avoided. The same engineer who recommended the earth-coupled heat pump also installed the first retrofit air-to-air heat exchangers in a 13 story electrically-heated high rise a year ago. This installation, coupled with a few other improvements, was predicted to achieve a 20.5 percent reduction in electrical use. So far, a 30 percent reduction has been achieved, and tenants find the air quality and comfort of their apartment vastly improved.

CONSTRUCTION SUPERVISION

Once the appropriate measures for a particular building are determined, they must be properly installed. How anything that is so obvious can be so difficult to achieve remains a continuing headache for CCC and, perhaps, for all engineering or construction firms. Contractors seem to have a constitutional aversion to completing work on time and according to specifications. To counter this aversion, CCC holds back payment, levies fines, and refuses to accept subsequent bids from repeaters. This, the fourth key component of CCC's operation, has also evolved over the past three years.

Originally, the energy auditor was responsible for construction supervision as well. In most cases, this combination of duties was not successful. Construction supervision requires a particular set of skills quite different from those needed to be an energy engineer. Contractors must be handled forcefully and without compromise. A good construction supervisor frequently has contracting experience and knows the tricks of the trade. Engineers often lack that requisite experience and temperament.

The ability to develop and stick by very specific bid specifications is another important aspect of construction supervision. Wherever bid specifications are vague, count on trouble; where they permit interpretation, bids will vary widely. CCC has spent hundreds of hours perfecting its bid specification writing techniques. This has proven beneficial for both the construction supervisor and contractors. Contractors are able to write clear, acceptable bids. The construction supervisor must know precisely what work is to be completed and how to get the best out of contractors. Concise specifications are essential to this task.

MONITORING FUEL CONSUMPTION

After the improvements are installed, fuel consumption must be monitored monthly in those buildings in which CCC has guaranteed the savings. This is the fifth key element of CCC's approach energy conservation in multi-family buildings.

There are, as of the date of this report, 14 centrally heated buildings in which savings have been guaranteed and in which work was completed at least a year ago. In accordance with the original program design, building owners pay the bank a single monthly payment, equivalent to their historic energy bill. The payment is used to repay the conservation loan and to pay the current (reduced) fuel bill. The amount of the payment can be adjusted for degree-day variations and fuel price inflation. Theoretically, these adjustments will be made annually on the anniversary of the building's loan closing. In reality, they occur when it becomes apparent that the monthly payment is not adequate to make loan payments and meet fuel costs. This has happened twice.
A report on the energy use in CCC buildings is sent to the building owner each month, along with copies of paid bills and appropriate conservation advice or recommendations. Tenants receive periodic letters with energy saving tips as well.

Financing the Improvements

CCC's financing mechanism is another key component of its approach to energy conservation in multi-family buildings housing low-income and elderly families. It is as essential to the CCC operation as all the other components -- marketing, tenant involvement, energy conservation technology, construction supervision and monitoring.

Because CCC is a private, non-profit (501c-3) organization, it is able to receive grants from government, utilities, and foundations. These grants permit CCC to capitalize its business and to establish a revolving loan fund at reduced interest rates. The first CCC loans were made at 13 percent when the going interest rate for home improvement loans was 19 percent. Now, through the CCC/Bay State Gas program, CCC is making loans at 50 percent of the prime rate (around 6 percent), and in the CCC/MHFA program at 5 percent. The importance of reduced interest rates is readily understood when examining the paybacks on specific conservation improvements: measures that can pay for themselves in five years at 5 percent interest take six to seven years at current market rates.

The way loan funds are administered is another area in which CCC has made fundamental changes over the past three years. Initially, granted funds were used as collateral to guarantee loans made by a local bank. As indicated in the program description, CCC would deposit in the bank an amount equivalent to the principal of the loan; this deposit would insure the bank against risk, reduce the interest rate, and pay for the bank's services. While this procedure successfully protected the bank against financial loss, it proved to be a time-consuming, cumbersome process that militated against CCC's efforts to become an efficient, self-supporting business. Due to the bank's size, employee vacations and misrouted paperwork, it often took weeks, even months, to complete credit checks and loan approvals. Although the bank vice president in charge of handling CCC's project was diligent in her efforts to correct errors and improve efficiency, the fact that the conservation loan program was only a miniscule part of a huge institution's loan operation precipitated its inevitable drop to the bottom of the priority pile. Delays cost CCC money and loss of credibility among customers.

Additionally, the original structure of the financing mechanism did not adequately reflect the relationship between CCC's guarantee of the savings in centrally heated buildings and the loan guarantee. Clearly, if participating buildings did not achieve the fuel savings projected by the energy engineers, cash savings would simply not be available to cover loan payments as well as fuel costs; funds would have to come from somewhere to meet the warranty obligation. A drawdown of the loan guarantee fund was anticipated in the original program concept, but procedures for this contingency were not explicitly set forth in the CCC/bank agreements.

To correct these deficiencies, CCC has restructured the priority of payments to fuel dealers, itself, the loan fund, and in the case of the Bay
State Gas Program, has assumed all banking functions. These changes have greatly improved CCC's ability to deliver energy improvements to multi-family buildings and to protect itself against loss due to engineering miscalculations or temporary malfunctions of energy efficiency equipment.

As the outstanding Chevron loans are retired, CCC will withdraw the freed-up funds from the bank and loan them out itself, gradually dissolving the relationships with the lending institution. This will make it possible for CCC to loan the Chevron funds at the same interest rate as the Bay State monies, and operate more efficiently. Any organization or agency seeking to replicate the CCC model should build into its structure a similar mechanism capable of handling conservation improvement loans internally.

ADMINISTRATION AND DEVELOPMENT

In order to manage the growth and day-to-day operations of Citizens Conservation Corporation, a strong administration and development component is essential. This is the seventh key to energy conservation in multi-family buildings. Such a component has five basic functions: 1) Business Plan Development; 2) Marketing; 3) Fundraising; 4) Staff Supervision and Training; and 5) Financial Management.

In May 1983, CCC wrote a Business Plan for the coming year. In addition to a statement of purpose -- the objective of the plan -- it covered marketing (current and potential markets) capitalization, manpower requirements, and facilities requirements.

The development of the Business Plan proved to be a valuable exercise, and should be performed by any organization that intends to establish a similar non-profit energy services company. The plan development process forced CCC to focus on its own identity and reaffirm its purpose; to identify markets; to develop a strategy for fundraising, and to project levels of business and cash flows necessary to become a self-supporting entity. From these definitions and findings, CCC was able to extrapolate manpower, facilities, and equipment needs.

Each community's market make up, i.e. types of apartment buildings and universe of need, will vary, as will the potential sources of capitalization and loan funds. These factors should be pinned down before any field staff is hired. The engineering qualification needed in the field will be determined by the configuration of the market to be served. The loan fund potential also defines the scope of the operations; i.e., the number of apartments that can be improved. CCC's average cost per unit is approximately $1,050.00. The optimum level of activity will keep staff busy year round and generate sufficient income to support salaries and overhead. The Business Plan outlines a strategy to reach this volume.

Once the market has been defined, loan funds raised or identified, and staff hired, the General Manager must turn his or her attention to the achievement of corporate objectives. This is done, of course, through the company employees. CCC's staffing pattern includes a Field Operations Manager, an Administrative Assistant, and an Operations Analyst directly accountable to the General Manager. Field operations staff, consisting of Energy Engineers, Construction Supervisors, the Director of Tenant Education, and an Operations Assistant, are accountable to the Field Operations Manager.
The General Manager reports to the Executive Vice President, who is also a full-time staff member. Policy decisions, fundraising, and the overall direction of the corporation fall within the purview of the Vice President.

The marketing of CCC's services to building owners is a responsibility shared by the Vice President, the General Manager, and all of the field operations staff, including the Tenant Education Director. CCC employees must understand that selling energy conservation involves an on-going relationship with building owners from the time an agreement is reached to undertake the energy study until the last installment on the conservation loan is paid. Building owners agree to buy their energy conservation from CCC when they have confidence in the company's ability to produce and sustain the savings. This confidence is undermined when engineers talk down to clients, when reports contain mathematical errors, or when contractors fail to keep appointments. Once a building owner enters into an energy study agreement, CCC must produce the completed report quickly and accurately. This demands a concentrated, highly disciplined effort on the part of the field operations and support staff. Many engineers are inclined to study problems, rather than solve them. CCC has lost more sales (and several engineers) as a result of drawn out energy studies scheduled to take 30 days, but in fact still unfinished after 60 or even 90 days, than for any other reason.

Fundraising is also an on-going activity. As indicated earlier, CCC's expansion has been made possible by the commitment of loan funds from Citizens Energy Corporation, the Massachusetts Office of Energy Resources, and Bay State Gas Company. CCC expects to expand the pool of loan funds granted by the agencies and to tap new sources as well. The Massachusetts Executive Office of Communities and Development and the City of Boston are potential sources, as are foundations with a strong interest in energy conservation and the improvement of living conditions for low-income people.

If the federal government undertakes more enlightened economic policies resulting in the reduction of interest rates to a reasonable level, conventional loans could become an endless funding source. This turn of events, however, seems highly unlikely.

With as many as 35 buildings scattered across the Commonwealth under study or in construction at any one time, staff supervision becomes a very demanding task. CCC seeks to bring this task under control through the utilization of a series of computer generated weekly reports. These include a "Pre-Construction Report," used to monitor progress on buildings in which an energy study is being prepared or bids are being solicited; a "Construction Report," that tracks contractors' progress as they complete installation work, and an "Hours Spent Report" that keeps tabs on the number of hours each staff member devotes to particular tasks at each building site. The Operations Analyst is responsible for producing these reports each week. They are distributed to all staff members allowing them to monitor progress on the projects for which they are responsible.

Because energy conservation in apartment buildings is a relatively new field in which technological innovations are sprouting almost daily, an on-going staff training program is another corporate need. At CCC, the Field Operations Manager is responsible for the training program. At periodic, full day training sessions, new staff are taught to conduct energy studies and write
audit reports in accordance with CCC's procedures; marketing and writing
techniques are improved, and product representatives sometimes attend to
explain their wares. CCC also contributes to the cost of academic courses
related to staff members' jobs.

Financial management is a responsibility under the General Manager's
day-to-day supervision. In addition to managing CCC's various loan funds,
monthly incomes and expenditures must be overseen as well. Because CCC began
as a pilot project under Citizens Energy Corporation, management of income and
expenses began under the supervision of CEC's treasurer and has remained there
up to the present. This has not proven to be an ideal arrangement. Monthly
reports have been delayed for as much as half a year, making it impossible for
the General Manager to have anything more than a very uncertain knowledge of
cash balances and revenues. CCC, as any other business, should manage its own
funds to assure control and accountability. The transfer of all financial
management from CEC to CCC is one of the company's highest priorities. Staff
training and the establishment of appropriate systems for this purpose is
underway.

Conclusion

Three years ago, the need for a mechanism capable of lessening the burden
of high energy costs on low-income and elderly apartment dwellings was
recognized by Citizens Energy Corporation and a new entity, a non-profit energy
services company, was established. That company, Citizens Conservation
Corporation, beginning with a unique pilot project, has grappled with this need
and, in the process, has changed and modified its approaches to the achievement
of energy conservation in multi-family buildings in numerous ways. These
changes were made because many assumptions implicit in the original CCC program
design were found to be seriously flawed.

Energy experts and computer generated audits are not a reliable means to
either determine appropriate conservation measures for a specific building
or to predict energy savings. Rather, a building-specific approach that
concentrates on a particular building's idiosyncrasies is required.

Tenant rebates that are not tied to individual apartment energy usage have
no discernible effect on resident behavior, and they are an impediment to
selling the product — energy conservation — to the building owner.
Energy service agreements that include provisions for investing excess
savings in further building improvements are an alternative that appeals
to both landlords and tenants, and have the advantage of further reducing
energy consumption and increasing tenant comfort.

The belief that building owners are disinclined to invest in energy
conservation because they can pass fuel price increases along to tenants
is naive. Building owners are not interested in energy conservation per
se, they are interested in increasing profits and cutting losses. The
marketing of energy conservation must be responsive to these concerns.

A non-profit energy services company fashioned after the CCC model should
be able to support itself from fees for services once it is fully staffed
by a competent, dedicated team combining technical know-how, social and
educational skills and strong management. However, getting to that level
involves an extended learning curve and large capitalization. Governments, foundations, or utilities considering supporting the establishment of a non-profit energy service company should plan to lose money for two to three years.

The need for energy conservation in apartment buildings housing low-income and elderly residents remains vast. CCC is one mechanism for meeting that need. There are undoubtedly other means, such as controls and statutory coercion, but we know of none that balance tenant and landlord interest more equitably than CCC.