

Those are Incentives, Not Rebates: Using DSM Funds to Leverage Investment in Low-Income Multifamily Housing

Elizabeth M. Chant, Vermont Energy Investment Corporation

Michael Sherman, Peregrine Energy Group

Jennifer L. Chiodo, Vermont Energy Investment Corporation

ABSTRACT

Vermont established the Residential Energy Efficiency Program (REEP) in 1997 to overcome barriers to energy improvements in low-income multifamily housing and to promote energy investment in this difficult market. REEP's innovative design combines DSM resources from partner utilities with resources from the low-income Weatherization Assistance Program (WAP) and provides technical assistance that includes input from both the REEP and WAP technical staffs.

REEP is comprehensive in its approach and fuel-blind in its use of incentives. All cost-effective opportunities for energy savings are analyzed and presented to building owners. DSM and WAP incentives are pooled and used to promote the full package of recommended measures. Incentives are presented in support of the comprehensive project, rather than on a prescriptive-measure basis. This allows REEP to encourage adoption of all cost-effective measures, rather than capturing only electric savings or only those measures with short paybacks that owners would do on their own with no incentive.

Since 1997, REEP has addressed more than 1,350 residential units and estimates annual savings of 3,866 MWh and 13,506 MMBTU (net for fuel switch projects). Annual energy cost savings are estimated at over \$475,000. With \$750,000 in incentives, REEP has generated nearly \$2.3 million of efficiency investments.

This paper examines factors that contribute to REEP's success in this difficult market and explores potential replicability. The design of the program, the willingness of the utility and WAP partners to be innovative, and the flexibility of REEP's implementation are just some of the keys to REEP's successes.

Problem

The barriers to improving the energy performance of low-income multifamily housing are well documented (DeCicco 1995). Most barriers are no different in Vermont than anywhere else in the country, but the results can be more dramatic: In a climate like Vermont's, many argue, housing can only be affordable in the long term if it is energy efficient.

The familiar split incentive problem is a major financial barrier to many projects. Owners who do not pay utility and fuel costs have no apparent gain from making energy improvements. Low-income residents with short-term tenure have little interest in improving the energy performance of a property. This problem is exacerbated in affordable housing because long-term residents with an interest in reducing costs generally do not have the means to do so.

Subsidized housing markets face additional barriers. These also are well-known and, for the most part, documented (DeCicco 1995; Neme 2000). Some barriers are built into legislation; others are in regulations; still others come from guidelines developed for different assistance programs. The focus of this paper is not the barriers, but rather ways to overcome the barriers. Below, we describe a few of the more onerous and critical barriers to upgrading energy performance.

In housing projects with ongoing subsidies, utility costs are often treated as direct project expenses and passed through to the subsidy source. Investments in energy efficiency are often unrecoverable because subsidies are reduced as costs go down. Projects with ongoing subsidies have significant restrictions on financing options for energy projects. These can range from restrictions on use of existing reserve replacement accounts to prohibitions on outside secondary financing, regardless of the merit of the project.¹

The technical challenges faced by those trying to improve energy performance are significantly more daunting than those faced in the single-family residential market. Less is known about the performance of multifamily buildings. Less is documented on savings potential and savings strategies. There is much more customization to the work, and technical specialists, therefore, have less to rely on in terms of predicting how energy systems in these buildings will perform. In some respects, the energy issues in this market are akin to those in the commercial and industrial sector.

These factors make it more important to build and maintain a “center of knowledge” on which housing owners, developers, and managers can draw. One member of the National Affordable Housing Network who conducted survey research on barriers noted that “Public policy leaders often assume that the technical side of the energy efficiency transition is well established, yet many housing organizations express confusion over which energy efficiency measures make the most sense to employ” (Miller 1994).

There is also a significant information barrier in having to obtain information about or provide information to multiple programs. It is a barrier when a developer or manager of an affordable housing project must contact and provide information to multiple programs to gain the use of available services and incentives. Prior to REEP, for example, projects in certain areas of Vermont would contact for technical and financial assistance the local electric utility, the local gas utility (in areas served), and the local provider of the low-income Weatherization Assistance Program (WAP). Additionally, programs provided by electric utilities differed around the state. Affordable housing developers who work across the boundaries of Vermont’s more than 20 electric providers faced very different incentive programs, depending on where a project was located.

The very size and number of multifamily projects in Vermont is also a factor. Vermont is a small, primarily rural state. Affordable housing projects that are scattered around outside of the larger towns and cities are generally well under 50 units. Projects as small as 4 and 6 units are not uncommon. There are fewer than 12 low-income housing projects in the state with more than 100 units and only about 50 projects that have more than 50 units. Improving energy performance in such small-scale projects rules out the use of standard performance contracts: potential efficiency is too small to support the cost of analysis and project management.

¹ REEP commissioned a white paper to identify the barriers to improving energy performance at HUD multifamily projects and to identify strategies to address barriers. See Neme 2000.

Program History

REEP was first proposed to the U.S. Department of Energy's Rebuild America program in 1996 by the Vermont Department of Public Service (DPS) working in close collaboration with the Vermont Office of Economic Opportunity (OEO) and several of the state's larger utilities. OEO is the state agency responsible for the low-income Weatherization Assistance Program (Vt. WAP). Unique among weatherization programs in the U.S., Vt. WAP is primarily funded by a statewide gross receipts tax on bulk fuels. Vt. WAP is less dependent on DOE funding because of this separate and significant source of funding, which in most years accounts for more than 80 percent of Vt. WAP program funding.

DPS received a grant from DOE Rebuild America in 1997 that provided initial funding for the development and administration of REEP. OEO served as the contract administrator for the program and issued a request for proposals for program design and implementation. Vermont Energy Investment Corporation (VEIC), a local nonprofit energy services firm, provided the winning proposal for the program, and was contracted in May of 1997 to deliver the program. OEO served as contract administrator and fiscal agent, handling both DOE funding and funding from the participating utilities, from the start of the program through February 2000 when Vermont established a statewide efficiency utility. REEP is one of the core programs provided now under the statewide utility, which VEIC has been contracted to implement for the Vermont Public Service Board.

Participating utilities in the program from 1997-2000 included three investor-owned electric utilities (Central Vermont Public Service, Citizens Utilities, and Green Mountain Power) and one investor-owned gas utility (Vermont Gas Systems). An Advisory Committee for the program was established at the start, with representatives from the participating utilities as well as DPS, OEO, and the Vermont Housing Finance Agency. The Advisory Committee has been crucial in the program's development over the past 2-1/2 years, providing a nonadversarial forum that represented the interests of the program designers and funders.

Program Design

REEP's program design specifically takes account of the barriers identified earlier and is designed to overcome as many of the barriers as possible. One guiding principle of REEP is the adage that on their own "energy audits do not save energy." REEP's goal is not to complete audits, but rather to improve energy performance in multifamily housing. Many affordable housing projects in Vermont, as elsewhere, are required to have energy audits at specific times. REEP will participate in these audits at no cost to the project if there is some level of commitment to install recommended measures. REEP will not participate on a no-cost basis if the audit is being completed to satisfy a regulatory requirement and there is no intention to improve the property.

Possibly the most important design element of the program, especially for the early years, has been flexibility. The flexibility has allowed the program to adapt as new techniques are tried and new barriers are identified and targeted. This flexibility has meant that the program must be responsive to changing conditions. While originally conceived as a way to target and implement fuel switching from electric to oil or gas space heat, the program now works on all types of projects, including new construction and rehabilitation

projects as well as projects where the only improvements are energy-related. The change allows REEP and its clients to take full advantage of available opportunities for saving energy. In allocating its program resources, projects that present one-time or "lost" opportunities take precedence over those that can be completed at any time. For example, a scheduled new construction or rehabilitation project that provides significant opportunities for cost-effective improvements in a variety of areas, will be addressed before an elective energy-only retrofit project.

Early elements of program design and staffing focused on financial and regulatory barriers. While these are important and need continued attention, they are also the barriers that take the most time to address. No program--public, private, or combined--has the ability to overhaul unilaterally federal and state housing regulations. As needed as an overhaul may be, those changes will take many affordable housing and energy advocates working in concert over time. In the meantime, the program and the individual utilities were both oriented to obtaining savings for low-income Vermonters.

REEP was designed from the start as a one-stop service for its clientele of property owners, developers, and managers, and to a large extent it has been that. Clients have one point of contact for available electric incentives, available gas incentives, and available participation by Vt. WAP.

REEP also provides a soup-to-nuts approach to project management. For eligible projects, there is no cost for technical assistance, and the project uses a one-stop approach to project management as well. REEP Project Managers provide a comprehensive and integrated service to clients, including:

- feasibility analysis to identify critical energy issues
- cost estimation
- collaboration with project architects and engineers on efficient design
- plan review for compliance with Vermont's Residential Energy Code
- projection of energy costs and calculation of utility allowances
- utility and fuel record analysis
- assessment of building and system conditions
- energy analysis and recommendations
- specification preparation
- bid review
- contractor negotiation and contract preparation
- contract management
- final inspection
- heating system commissioning
- analysis for restructuring utility payments and allowances
- assistance with fuel procurement
- ongoing assistance with building performance issues

Clients are not shuttled from one staff member to another as they go through the program. This helps to build valued and trusting relationships between program staff and building owners, developers, and managers. These relationships quickly provided the fodder for additional REEP projects. Though early program developers had considered that marketing would be a challenge, REEP has had little need to market its services as clients have provided a valuable source of project referrals.

REEP is comprehensive in its technical scope. It is a rarity (and requires special exemption) for a project to encompass only lighting, for example, or only domestic hot water measures. The program's comprehensiveness is not compromised by a requirement to look only at electrical measures or only at gas measures. While the program must be cost-effective based on electrical savings, it is fuel-blind in its approach, looking for all long-term cost-effective opportunities for energy savings. Like other energy-related programs, REEP also pays close attention to certain health-and-safety issues (e.g., ventilation, back-drafting of combustion appliances, etc.). REEP examines all energy systems and end uses in a project, including heating system and distribution, domestic hot water system, building shell, lighting, ventilation, refrigeration, laundry, water conservation, utility metering, and fuel buying. Measures are recommended based on lowest long-term life cycle cost. Project incentives are made available based on screening for societal cost effectiveness of electrical measures, but total incentives for a project are negotiated based on overall energy efficiency.

Too often, energy programs look at comprehensiveness as increasing difficulties (and there is no doubt there are difficulties). REEP sees comprehensiveness as a way to improve measure acceptance. If the client is able to look at the payback of a whole package, instead of individual measures, there is more likelihood of acceptance of more measures. Instead of "skimming the cream" off the top, the program provides the mechanism so that short-payback measures can, in effect, help promote the installation of measures that are cost-effective but have longer paybacks.

That is the goal for use of incentives as well. The bottom line is to promote adoption of efficiency improvements. In the negotiation that inevitably follows REEP's comprehensive recommendations, incentives are used strategically to make the economics work for the owner. This is always tempered by the relative importance of the measure to the overall energy efficiency of the project. If an owner or manager questions the value of a measure that is considered critical by REEP, the program may target incentives so that the measure cost is effectively zero to the owner. (If the owner does not do that measure, the project loses the cost of the measure from the final incentive package.) If an owner balks at a measure with minor energy impacts, on the other hand, it may ultimately have little or no effect on the overall incentive package.

The goal of comprehensiveness has to be and is tempered by the realities of affordable housing. Budgets are limited and needs are not. If implementation of all measures at once is not possible, REEP will work with the property owner or manager to see if a staged approach may be an option. Strategic use of measure and incentive staging can help to structure an acceptable approach.

The realities of this market also temper the technical side of the program. While REEP's energy specialists are well-versed in the latest energy-saving technologies, in general, the affordable housing community cannot be early adopters of untested technologies. This is a lesson that REEP has learned by listening to its clients and constituents. While occasionally there will be a project that lends itself to adoption of some new technology or technique, for the most part, affordable housing managers have to rely on the "tried and true." Operating budgets are so tight that they cannot take the risk that an untested technology may not provide the savings indicated or could cause operating problems that could increase expenses and endanger the viability of the housing.

Results

REEP's results clearly show the program works. The program has had measures installed in more than 1,350 low-income multifamily residential units. This includes nearly all new construction and major rehabilitation projects undertaken in the state and less than ten percent of all subsidized housing projects in the state. Installations in the first year were generally very limited in scope, rather than the comprehensive approach that has become REEP's standard. The average annual MWh savings per unit has increased from less than 1.0 in 1997 to more than 2.8 for the program to date. The same upward trend pertains to annual MMBTU savings per unit addressed, which has increased from 1.25 for installations in 1997 to 9.85 for the program to date. From program start in 1997 through the end of 1999, REEP estimates annual MWh savings of 3,866 and lifetime MWh savings of 69,576. Annual MMBTU savings are estimated at over 13,500 (calculated on a net basis for fuel switches).

REEP's success in leveraging available resources means that all partners are benefitting: the electric and gas utilities, the weatherization program, and the affordable housing community. Each partner is taking their limited energy investment dollars and getting more energy savings than they could on their own.

Project incentives have been in the range of 30 to 35 percent of total measure costs, with the owner providing 65 to 70 percent of the cost of installed measures. Electric incentives were approximately 60 percent of all incentives paid (or 20 percent of all measure costs) and were provided on all 38 projects that had installations. Gas utility incentives were utilized in only four projects because of the very limited natural gas distribution area in Vermont and account for approximately five percent of all incentives paid. Subsidized work by Vt. WAP was included in 20 of the 38 projects and accounts for approximately 35 percent of all incentives paid and roughly 12 percent of total measure costs.

REEP uses as one of its assessments of cost-effectiveness the results of a screening tool developed by the Vermont Department of Public Service. The screening tool compares all societal costs and benefits of a given measure, including utility avoided costs. The present value of net societal benefits is one measure of the value the program is providing that captures not only project costs and energy savings, but also any maintenance savings and the benefits of demand reductions.

During 1999, REEP's Advisory Committee commissioned an evaluation of the program's processes. It was too early at that stage of the program, with the vast majority of major measures having been in for less than a year, to evaluate the program's impacts in any meaningful way. The process assessment addressed "the effectiveness with which REEP accomplishes its many tasks in furtherance of its overall program goal of producing comprehensive energy efficiency improvements to low-income multifamily developments in Vermont" (Sherman 1999). Overall, the program's effectiveness was given very high marks. The strength of the staff's expertise in many different areas (heating systems, building, electrical measures, negotiation, communication, etc.) was commended by the evaluator. Comments from focus groups of REEP's clients and constituents provided additional evidence of the strength of the approach.

Finally, one measure of success for nearly any business is repeat business. After the first few outreach efforts as the program was initiated, REEP has had to do very little marketing or outreach. Most projects have come into the program through references and repeat business. Many developers, owners, and managers are on their second, third, even

fourth REEP project, indicating their acceptance of REEP's methods. The program has cleared the initial acceptance barrier and is now viewed as a valuable resource. One would expect that word of mouth among the owner and management community will assure a continued flow of projects, given the initial favorable response to the program.

Factors in Success

Like any successful program, REEP has a variety of internal and external factors working for its success.

Internal Factors

The most effective internal factors promoting REEP's success are the dedication and innovation of the staff who implement the program. Staff members are creative in the use of available resources and incentives. If there is a way over, around, or even through a barrier, REEP will find it. REEP's driving goal is the installation of all cost-effective measures in Vermont's affordable housing stock. While we will not say that REEP's technical and managerial staff "never take no" for an answer, it is safe to say that they will identify and provide for owners, developers, and managers, every possible reason to say "yes." They work to overcome barriers--not just programmatic barriers like those identified above, but also project-specific barriers.

Some owners and managers are uncomfortable with the negotiated project-based approach to incentives that REEP uses. The benefits are not obvious at first, and the lack of certainty is a major hindrance for some. Utility rebates in the form of "put in that light, and I will give you this many dollars" provided developers, managers, contractors, and others with certainty. Moving into a negotiated environment where final incentives are based on the overall energy efficiency of the project reduces certainty and can be of concern to some owners.

The use of project-based incentives helps to shorten payback periods. Additionally, the incentives can be used strategically and to maximum effect by tying them to specific measures only when and if necessary to bring a specific payback to a certain level or even to reduce an incremental measure cost to zero. The real success story here is in fact a combination of project-based incentives with maximum program flexibility. In order for the program to provide cost-effective savings to the participating utilities, those utilities have allowed incentives to be used to maximize overall project efficiency.

External Factors

One factor working in REEP's favor is the high cost of electricity in Vermont. Like other New England states, electricity costs in Vermont are two to three times electricity costs in other parts of the U.S. In those instances where the owner does gain the savings (no split incentive issue), payback periods for electrical measures are significantly shorter. Like other New England states, Vermont also faces fuel price spikes at certain times of the year that raise the year-round average cost of fuel and also help to shorten payback periods.

Like any successful program, a wide network of support has enabled REEP's development and success. The Vermont Department of Public Service (DPS) was an active

participant in the development of REEP, having obtained the first round of funding for the program from U.S. DOE's Rebuild America Program. The support has helped the program staff design the program for long-term cost-effectiveness in delivery and has helped the participating utilities by assuring them that the program, not the individual utility, would be responsible for responding to any questions about effectiveness and efficiency of REEP.

The support of state and local affordable housing organizations has been very important to REEP's success. At the state level, the Vermont Housing and Conservation Board (VHCB), which provides or administers significant development funding for many rehabilitation projects, recommends that projects receiving VHCB funding participate in REEP. VHCB has been an active proponent of the concept that housing that is not energy efficient is not affordable in the long term.

Two other statewide organizations, both crucial members of the affordable housing financing community, have also been very important to REEP's continued success in the state. Vermont Housing Finance Agency (VHFA) was an early partner and advocate of REEP's concepts and methods. Like VHCB, the housing finance agency had already recognized the importance of energy efficiency in its policies and procedures. VHFA had worked on efficiency improvements to many of the projects in its portfolio, often in cooperation with Vermont Energy Investment Corporation, the contractor chosen to develop and deliver REEP, as the technical consultant on the projects.

Housing Vermont, a nonprofit organization responsible for the development of many projects with Low-Income Housing Tax Credit (LIHTC) funding, has also been a supportive and useful partner to REEP. Unlike the local affordable housing groups with which it partners on a specific project, Housing Vermont works statewide. More than any other developer, it experienced the vast differences in technical services and incentives available for efficiency measures across the state. Prior to REEP, a 20-unit fuel switch and rehab project might be supported by utility incentives of \$40,000 in one town and \$0 in another. The technical resources of utility staffs and their availability to provide technical assistance also varied tremendously by which utility covered the territory. Housing Vermont has been a strong advocate of both the statewide uniformity that REEP provides as well as very appreciative of the technical expertise that the REEP staff brings to a project.

Replicability

An important question is whether REEP's success is a product of the special conditions and characteristics found in Vermont only or whether this program design can be replicated in other states and regions of the country. The experience with REEP so far suggests there are some minimum requirements to satisfy for a program like REEP to be successful in other states. REEP's experience suggests that these requirements center on the combination of technical and managerial resources, a commitment to leveraging comprehensive energy efficiency, and the formal and informal networks that link the housing and energy efficiency communities.

Staffing and Management

Too often in affordable housing projects, not all potential energy improvements are made because building owners and managers do not have the capabilities needed to assess

the technical aspects of a project (or to judge the technical assessments made by others). They also very often do not have the resources, skills, time or interest to manage procurement, construction, and quality control. REEP's staffing is designed to combat these problems.

From the participant's viewpoint, REEP is designed as a one-stop shopping operation. This approach is intended to remove most of the barriers that would normally impede owners and managers from participating in the program. The REEP Project Manager is the face of the program throughout the process, even though a number of other resources, actors and contractors may be required at some time during the project and may sometimes interact directly with the owner or manager. The Project Manager is responsible for coordinating everything that needs to be done in a project.

This approach has several important requirements, all of which should be replicable.

- a. Project Managers must be broadly skilled and deeply experienced in technical and project management areas.
- b. A very high level of communication must be maintained between the program and the owner; between the Project Manager and contractors of goods or services; among the program's technical, financial and managerial staff.
- c. Project information systems must be well developed, up to date, accurate, and accessible.
- d. Costs must be carefully estimated and closely watched.

Although this style of operation is replicable, it can be expensive because of the intensive time requirements on the part of the Program Director, the Program Manager, and other staff.

Commitment to Comprehensiveness

REEP began with a traditional measure-based incentive approach. Early experience made it clear that this did not support REEP's goal of achieving comprehensive energy efficiency improvements. REEP has developed and is committed to a strategy that leverages owner investment to maximize adoption of comprehensive energy efficiency. Programs that seek to replicate REEP's success must be clear in the objective of comprehensiveness and the need to seek significant customer investment to accomplish that goal.

Organizational Support

Vermont may be unusual in the extent to which the low-income housing community has been conscious of energy efficiency concerns. In the world of low-income multifamily housing, it is too common for developers to focus on limiting first costs in design and construction, because of the funding constraints under which they normally operate. This often means that low-income housing, far from being built at the forefront of energy efficiency, frequently lags behind prevailing practice, especially where there are no energy codes or lax code enforcement.

With the exception of the organizations that have supported REEP from the start, there is very little in REEP's experience that cannot be replicated with the right program staff and design. REEP's start was very much assisted by its strong support from the Department of Public Service, the Office of Economic Opportunity, the Vermont Housing Finance

Agency, and the partner utilities. Is that sort of support replicable? The organizations may vary from state to state, but in any given state, the basic parameters of organizational support by the public and private sectors can be garnered if the desire and commitment to developing the program exist.

REEP's success was also assisted by the selection of Vermont Energy Investment Corporation (VEIC) as the contractor. VEIC had staff with the skills, experience, and innovation to bring the concept to fruition.

The membership and participation by the Advisory Committee was also very helpful in keeping the program headed in one direction despite differences among individual partners. The continued participation by the utilities was helpful, as was the active participation by the Office of Economic Opportunity and the Department of Public Service. The Advisory Committee provided a forum for expeditiously addressing issues such as income guidelines different from WAP and the need to serve major rehabilitation projects and the new construction market.

All these actions created consistency and continuity in the program. Although these arrangements were unusual for typical regulated utility DSM programs, they do not differ greatly in concept from approaches in several states using Systems Benefits Charges.

Factors Not Replicable

One combination of factors that is not replicable (though Vermont is not the only location where it exists) is the combination of severe winter weather and high electric costs. Whether or not this program would have the same efficacy were it situated in a state that had power costs at the lower end of the spectrum, it is possible that the entire incentive structure could not be replicated in a lower cost energy environment.

Areas for Change in the Changing Environment

In March 2000, Vermont's Public Service Board implemented a statewide efficiency utility that delivers a set of core programs targeted to specific events and participants that are underserved by traditional market mechanisms. REEP is one of those core programs. The contractor selected as statewide efficiency utility, Vermont Energy Investment Corporation (VEIC), is the same nonprofit energy service firm that has designed, developed, and implemented REEP since 1997.

The establishment of the efficiency utility may provide some opportunities for change in the program. Some streamlining of program processes is already underway. Multiple screening tools are no longer required on a given project. The statewide efficiency utility needs to utilize only the statewide screening tool and does not need to account for differences in benefits to a specific utility. This allows additional streamlining through integration of analysis, screening, and reporting that was not possible when multiple utility screening tools were used.

REEP has already identified some areas for additional change and improvement. Once REEP is fully integrated into the new efficiency utility, work will begin on moving to a more prescriptive approach to measure recommendations and incentive packaging for new construction and major rehabilitation projects. REEP has found in the last three years that its recommendations on these projects are nearly always the same because the improvements

that are cost effective are nearly always the same for new construction and gut rehabilitation projects. The measures are known; the specifications have been developed. While the program has learned a great deal with its customized approach, a more prescriptive approach will result in greater measure adoption and increased program efficiency for these projects. REEP has started to develop some of the prescriptive recommendations for these projects and will be working closely with Housing Vermont and other affordable housing developers to devise workable approaches to achieve the best and most comprehensive results.

Even with a more prescriptive approach to new construction and major rehab projects, REEP will provide needed technical assistance and incentives for those who would want to go beyond the prescriptives to try new efficient technologies for example.

Conclusions

REEP has been very successful in its efforts to improve the energy efficiency of affordable housing in Vermont. Unlike so many other programs that have attempted to tackle this difficult market, REEP has been quite successful at getting measures accepted and installed by project owners, developers, and managers. The program provides a model for effectively improving the energy performance of low-income multifamily housing.

References

- Burger, Mark, and Val Jensen. 1998. "Performance Contracting for Small Fry - Including Individually Owned Multi-Family Buildings in a Public/Private Sector Partnership." In *Proceedings of the ACEEE 1998 Summer Study on Energy Efficiency in Buildings*, 2:13-20. Washington, D.C.: American Council for an Energy-Efficient Economy.
- DeCicco, John, Rick Diamond, Sandra L. Nolden, Janice DeBarros, and Tom Wilson. 1995. *Improving Energy Efficiency in Apartment Buildings*. Washington, D.C., and Berkeley, Calif.: American Council for an Energy-Efficient Economy.
- Miller, Barbara. 1994. "Barriers to the Adoption of Energy Efficiency in Low-Cost Housing Production." In *Proceedings of the ACEEE 1994 Summer Study on Energy Efficiency in Buildings*, 10:173-179. Washington, D.C.: American Council for an Energy-Efficient Economy.
- Morgan, Stephen. 1994. "Utility Multifamily DSM Programs and Public and Assisted Housing: Fitting Program Designs to Emerging Opportunities." In *Proceedings of the ACEEE 1994 Summer Study on Energy Efficiency in Buildings*, 10:181-186. Washington, D.C.: American Council for an Energy-Efficient Economy.
- Neme, Laurel Abrams. 2000. *Strategy to Reduce Regulatory Barriers to Energy Efficiency Improvements in HUD's Multifamily Low-Income Housing Programs*. White Paper. Burlington, Vt.: Residential Energy Efficiency Program.
- Sherman, Michael. 1999. "Program Review of the Residential Energy Efficiency Program." Unpublished report. Boston, Mass.: Peregrine Energy Group.

