BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION

COMMISSION

Docket Nos. UE-060256

WUTC v. CASCADE

RESPONSE OF PUBLIC COUNSEL TO STAFF DATA REQUESTS

Request No:	41
Directed to:	Judith Krebs
Date Received:	August 21, 2006
Date Produced:	September 6, 2006
Prepared by:	Jim Lazar
Witnesses:	Jim Lazar

WUTC STAFF DATA REQUEST NO. 41

Re: Witness Jim Lazar

Referring to page 39, lines 15 to 16 of Mr. Lazar's direct testimony, please provide all studies that Mr. Lazar has done that supports his statement that "Experience in many states suggests that providing a well funded and well-designed low-income assistance program will reduce the incidence of disconnections and also reduce uncollectible accounts for the utility."

RESPONSE:

Mr. Lazar has relied on studies done by others. See attachments WUTC 41 NationalSurvey2ded.10-00.doc, WUTC 41 Arizona Low Income Study.pdf, and WUTC 41 Colton funding fuel assistance.pdf.

Because of the voluminous nature of WUTC 41 Colton funding fuel assistance.pdf. it will be provided on CD only.

Low Income Issues Working Group Report

July 29, 1998

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Appendices:

I. Introduction

The purpose of this report is to present the findings and recommendations of the Low Income Issues working group. On December 26, 1996, the Arizona Corporation Commission issued Decision No. 59943, which established rules (Rules) designed to provide for a phased transition to a competitive retail power market. The Low Income Issues working group was formed in response to the recommendation of both the Customer Selection working group and the Unbundled Services and Standard Offer working group that the Commission form a working group to explore low income issues related to the introduction of retail electric competition in Arizona.

Low income programs are addressed by the retail electric competition rules in section R14-2-1608 which deals with the System Benefits Charge. The System Benefits Charge was created to ensure that customers who choose to participate in the competitive market will continue to contribute to the funding of public interest programs, such as low income programs, at the same level they would have contributed to these programs if they had stayed on standard offer service. The text of this section of the rules reads as follows:

"R14-2-1608. System Benefits Charges

A. By the date indicated in R14-2-1602, each Affected Utility shall file for Commission review non-bypassable rates or related mechanisms to recover the applicable pro-rata costs of System Benefits from all consumers located in the Affected Utility's service area who participate in the competitive market. In addition, the Affected Utility may file for a change in the System Benefits charge at any time. The amount collected annually through the System Benefits charge shall be sufficient to fund the Affected Utilities' present Commission-approved low income, demand side management, environmental, renewables, and nuclear power plant decommissioning programs."

Prior to the formation of the Low Income Issues working group, the Unbundled Services and Standard Offer working group considered the System Benefits Charge. This group recommended several changes to the rules to clarify issues surrounding the System Benefits Charge. The recommended changes are shown as follows (deletions have a strike through them and additions are double-underlined):

"~~In addition, the Affected Utility may file for a change in the System Benefits Charge at any time~~. Affected Utilities shall file for a review of the System Benefits Charge every three years. The amount collected annually through the System Benefits Charge shall be sufficient to fund the Affected Utilities' ~~present~~ Commission-approved low income, demand side management, environmental, renewables, and nuclear power plant decommissioning programs in effect from time to time."

II. Low Income Issues Working Group Activities

The first meeting of the working group took place on April 2, 1998. A total of eight working group meetings were held between April 2, 1998 and July 22, 1998. Appendix B shows a list of the organizations that participated in the working group, the representatives of each organization, and the dates working group meetings were held.

Salt River Project and the City of Mesa are not Affected Utilities under the Commission's competition rules. However, these entities participated in the working group and are included in discussions as necessary throughout the report to provide a more complete view of low income activities in the state of Arizona.

The group did not have a specific charge from the Commission beyond discussing low income issues related to the introduction of electric competition in Arizona. However, at the first meeting of the working group, the participants discussed what the goals of the group should be. The group established the following goals:

- Do not leave vulnerable populations behind: "Do no harm"
- Establish recommendations on low income issues and present them in as complete a form as possible to the Commissioners.
- Identify risks and opportunities for low income customers (real world impacts of competition).
- Strive for affordable energy service.
- Consider short, mid, and long term time frames.
- Generate a funding mechanism which would provide a level playing field to support low-income programs (intergovernmental agreements)

To achieve these goals, the group identified a number of actions to be taken.

- Look at optimizing the effectiveness of any new systems.
- Identify and quantify where we are now.
- Identify what other states are doing relative to low-income issues.
- Investigate centralized outreach (a statewide uniform program vs. utility-by-utility programs)
- Create a definition of and guidelines for affordable energy service.

The group attempted to identify low income issues which should be addressed in both the short and long term time frames. Through the process of considering low income issues in the group meetings, the group realized that some of these goals and actions could not be fully addressed within the scope and timeframe of the Low Income Issues working group.

One of the main concerns leading to the formation of this working group is whether low income utility customers will benefit from or at least not be harmed by the introduction of retail electric competition in Arizona. Currently the vast majority of low income customers served by

utilities regulated by the Corporation Commission have one or more low income programs available to them which are designed to make utility service more affordable. However, only 3 of the 11 Affected Utilities that have residential customers offer one or more low income programs. Concerns have been raised that low income customers, who could be perceived as being less desirable customers by potential future energy suppliers in the competitive market, possibly would end up paying exorbitant prices for electric utility service in the competitive market.

The group began discussing this issue in terms of providing universal service to low income customers in the competitive market. However, the group agreed that the term universal service should not be used because it has unneeded connotations, including its close association with Universal Service Fund activities in the telecommunications industry. The group discussed a number of possible terms to use for the overarching concept of addressing low income customer needs in retail electric competition. The term the group reached consensus on was affordable energy service. The group also created a two-part definition for affordable energy service which is: a) providing service to all customers at just and reasonable rates and b) providing non-discriminatory access to service. The group noted that utilities have current line extension policies that in some cases may limit the access of some rural residents to utility service, due to the prohibitively high cost of long line extensions. The group agreed that its definition of affordable energy service is not directed at utility line extension policies, but rather toward the need of current low income utility customers to receive electric service.

III. Consensus Recommendations

The group attempted to reach a consensus on low income issues related to retail electric competition. Consensus was considered to have been reached when all members of the group in attendance at one of the working group meetings agreed on a given consensus recommendation and the consensus recommendation was not changed at later meetings. Following each consensus recommendation is a short statement which provides the context for the consensus recommendation.

1. At a minimum, preserve the existing low income programs and funding for the affected utilities including rate discounts, weatherization, bill assistance, and education.

Prior to the introduction of retail electric competition in Arizona, some low income utility customers benefit from a number of low income programs, including weatherization, rate discounts, bill assistance, and energy education. The level of funding for these programs varies by utility and some utilities do not offer some or all of these programs. Arizona's low income utility customers should not see a reduction in the level of assistance they currently receive, as a result of the introduction of retail electric competition.

1A. Current levels of rate discounts to customers at current benefits levels should continue irrespective of energy supplier.

Low income customers should not see a decrease in their existing rate discount benefit as a result of changing energy suppliers. Current rate discounts typically are given as a percentage off of the customer's bill. In the competitive market, the generation and distribution portions of the customer's bill will be represented separately.

2. Statewide comparability of low income programs has merit and should be encouraged.

Recognizing that this requires ACC and State Legislative action, consistent systems of statewide funding for low income programs and equitable funding from all utility ratepayers should be encouraged. Statewide low income programs, which are consistent from utility service territory to utility service territory, are a complex issue which cannot be fully addressed by the Low Income Issues working group at this time. The working group discussed the pros and cons of such an approach and recognized that to pursue a statewide approach to low income programs, issues such as the multi-jurisdictional nature of Arizona's utility industry should be pursued.

3. All customers should pay system benefits charges on a non-bypassable per kWh basis.

The System Benefits Charge was created to ensure that all customers who enter the competitive market will continue to pay for certain public interest programs, including low income programs. Section R14-2-1608.A of the Retail Electric Competition Rules explicitly states that the System Benefits Charge is "non-bypassable" and should be recovered "from all consumers . . . who participate in the competitive market."

3A. We support adoption of Staff's proposed language in R14-2-1613.I.12 of the July 10, 1998 draft proposed revisions to the retail electric competition rules.

The proposed wording states that "Transmission primary voltage CT's and PT's may be owned by the Affected Utility only." This language closes the potential loophole to the non-bypassability of the System Benefits Charge of a large end-user beginning to take service off of transmission lines at the 69 kV or higher level. This type of bypass would reduce the amount of funding received through the System Benefits Charge for low income programs and other public interest programs.

*4. We support adoption of Staff's proposed language in R14-2-1608.A of the **June 23, 1998** draft proposed revisions to the retail electric competition rules.*

The proposed wording states that:

> "By the date indicated in R14-2-1602, each Affected Utility shall file for Commission review non-bypassable rates or related mechanisms to recover the applicable pro-rata costs of System Benefits from all customers located in the Affected Utility's service area who participate in the competitive market. Affected Utilities shall file for review of the System Benefits Charge **at least** (emphasis added) every three years. The amount collected annually through the System Benefits Charge shall be sufficient to fund the Affected Utilities' Commission - approved low income, demand side management, environmental, renewables, and nuclear power plant decommissioning programs in effect from time to time."

Adoption of the proposed changes to the rules would clarify this section of the rules, provide for a regular review of the System Benefits Charge and its components, and would allow for adjustments to the funding levels of programs. The July 10, 1998 version of Staff's proposed revisions to the retail electric competition rules deletes the words "at least" in R14-2-1608. The group strongly agrees that this wording should remain in the system benefits section.

5. *A low income customer needs assessment should be conducted.*

One aspect of addressing low income issues during and after the introduction of retail electric competition in Arizona is evaluating the needs of low income utility customers. Consistent with the working group goals, as shown in Section II of this report, a low income customer needs assessment should be conducted on a periodic basis, beginning with a baseline study. The needs assessment should address at least the following issues:

- An analysis of current low income statistics, including the number of utility customers at various levels of poverty.
- The impact of low income programs on the energy burden (percentage of income used to pay energy bills) of low income customers.
- The impact of low income programs on customer bills.
- An assessment of strategies to make energy bills affordable.
- The impact of retail electric competition on low income customers.
- A review of activities in other states related to retail electric competition and low income customers.
- Inclusion of other fuel types such as natural gas, propane, wood, etc., as appropriate.
- An evaluation of current low income programs.

Stakeholders, including affected utilities, utility distribution companies, and non-affected utilities, should participate in the needs assessment. Such an assessment should use existing resources, as feasible, and be done independently, as feasible.

6. *The Standard Offer Service offered by the provider of last resort shall assure that access to electric service by low income customers is not in any way reduced from that currently available.*

Staff's proposed language in R14-2-1606.A of the July 10, 1998 draft proposed revisions to the retail electric competition rules states that "After January 1, 2001 Standard Offer service shall be provided by Utility Distribution Companies who shall also act as providers of last resort." We support adoption of this proposed language. This will ensure that a provider of last resort is available to low income customers in the future.

IV. Description of Appendices

Further discussion of low income issues related to retail electric competition in Arizona is contained in the following appendices.

Appendix A -- Further Discussion of Low Income Issues

Appendix A contains a discussion of low income issues which were not fully addressed in the consensus recommendations. Issues include the affordable energy service, statewide versus utility company service territory low income programs, and the system benefits charge.

Appendix B -- Working Group Participants

Appendix B lists the organizations and individuals who participated in the low income issues working group as well as the dates the group held meetings.

Appendix C -- Low Income Programs in Arizona

Appendix C identifies the current level of funding for Arizona utility low income programs. There is also a complete listing of the low income programs available in Arizona from federal, state, and utility funding sources and a brief description of each program. A listing of all Arizona utilities who serve residential customers and each utility's number of residential customers is provided.

Appendix D -- Arizona Poverty Statistics

Appendix D contains eight tables that summarize poverty statistics at the national, statewide, county, and local levels.

Appendix E -- Electric Utility Low Income Rate Discount Programs

Appendix E lists the low income related rate discount programs offered by Arizona utilities.

LOW INCOME CONSUMER UTILITY ISSUES:

A NATIONAL PERSPECTIVE

Jerrold Oppenheim, Esq.

Theo MacGregor
MacGregor Energy Consultancy

57 Middle Street
Gloucester, Mass. 01930
Phone: 978-283-0897
FAX: 978-283-0957
JerroldOpp@tgic.net
TheoMacG@tgic.net

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INTRODUCTION

This report has been prepared to provide low-income advocates and other stakeholders information on the energy burden faced by low-income customers and programs designed to alleviate that burden in various states. The report describes programs designed to lower payments, manage arrearages, weatherize and provide other energy efficiency measures, educate consumers, increase outreach to the target population, and evaluate the programs. It discusses the costs and benefits of the various options -- to the degree this information is available -- and describes attempts to quantify benefits that have heretofore not been quantified.

The purpose of this report is to enable the low-income advocates and others to assess the options and design program most suitable for the citizens of their states or jurisdictions. It is not the authors' intent to recommend a particular course of action but, based on our broad experience in the field, to provide the information necessary for others to do so. We would be happy to answer any questions or provide further documentation on any of the material presented herein.

The original edition of this report was prepared for the Utah Committee on Consumer Services, pursuant to a contract with the National Consumer Law Center (NCLC), to provide information to the Utah Low-Income Task Force established by the Utah Public Service Commission. Attachment 1 is drawn from NCLC's 1998 Supplement to its Access to Utility Services; NCLC plans to update this list in 2001, and it will be available then from NCLC.[1] This report has been updated by the authors for this edition.

[1] Contact John Howat at NCLC, 18 Tremont St., Boston, Mass. 02108, tel. 617-523-8010.

SUMMARY

This report provides a survey of assistance programs that public utility commissions have approved in most states to assist the low-income customers of utilities within their states. Surveys find that there is no single model of low-income assistance; rather, each state has adopted a program that meets its particular circumstances. However, while the details of programs vary considerably, they all fall within four broad categories:

- Affordability programs, which provide direct assistance in paying energy bills;[2]
- Consumer protections, such as collection practices and installment billing requirements, which make it easier to pay energy bills on time;
- Education programs, which teach consumers about prudent energy use and counsel them about budgeting; and
- Efficiency and weatherization programs, which make investments to help consumers control their energy bills by reducing their need for energy.

Programs usually include more than one of these components. All programs also include outreach and evaluation components.

This report describes these options, the advantages and disadvantages of each, and the economic and other benefits of utility assistance programs for low-income customers. Low-income programs help participants by lowering the fraction of their incomes devoted to energy bills (the energy burden) from a very high level. In the United States, the median household devotes only 3.8 percent of its income to electricity while a family depending on a minimum-wage earner must devote 12.1 percent to energy while facing housing cost increases all over the nation. Low-income families unable to keep up with these pressures find themselves forced to go without power at times, to move, or to forgo other necessities such as food or medicine in order to pay their electricity bills.

Low-income assistance programs also benefit non-participants. The primary economic benefit to non-participants is reduced collection expenses that all customers would otherwise have to shoulder. Thus low-income programs reduce such utility costs as:

- arrearage carrying costs;
- termination and reconnection costs;
- costs of collection notices, termination notices, collection calls, and related activities;

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[2] Generally, assistance is either a fixed dollar amount or a fixed percentage of the bill. Many programs include an arrearage management component. In some programs, benefits are targeted depending on income. In others, benefits are targeted according to special needs such as an Supplemental Security Income (SSI)-qualifying disability.

- administrative and regulatory costs of disputed bills and other complaints;
- costs of establishing and administering payment plans; and uncollectibles and bad debt.

In addition, low-income programs reduce taxpayer costs for such functions as homeless shelters. These economic benefits have been demonstrated in utility-sponsored evaluations of programs that reduce low-income energy bills through such measures as efficiency investments, education, counseling, and/or arrearage management.

Programs that provide only direct assistance have been adopted primarily for non-economic (*i.e.*, equity) reasons and have therefore not been studied from this economic point of view. Economic principles, however, dictate that bill reductions from any cause will result in the enumerated savings. The studies that have been done show that expanded direct assistance programs that include efficiency, education, counseling, and/or arrearage management are economically cost-effective.

In addition, customer surveys have shown that a substantial majority of electricity customers favor programs that assist low-income customers. Assistance programs thus provide non-economic benefits to non-participants in the form of increased societal equity.

ENERGY BURDEN

One of the most difficult burdens faced by low-income citizens is the insufficiency of income to cover all basic necessities. Every day, low-income people must choose between heating and feeding their children, between electricity and medicine. One reason for this income gap is the fraction of income demanded by modern utility bills -- the energy burden.

As detailed in the update of a 1989 study compiled by the National Consumer Law Center (NCLC) in 1993, the energy burden (the amount that a household spends on all forms of energy as a percent of total income) is much higher for low-income families than it is for most families.[3] Whereas the energy burden for families with median incomes across the United States is approximately four percent, for low-income families, it ranges between 12 and 26 percent, depending on the source of income (*e.g.*, Supplemental Security Income (SSI), minimum wage, transitional assistance). For example, for single elderly poor and disabled people living on SSI, the burden was over 19 percent on average, over 25 percent in some states. In general, a family earning the median income had at least ten times more income to live on (and in some states, over 20 times as much) as did a family receiving welfare assistance.[4] Studies have also shown that, on average nationally, roughly 64 percent of the energy burden for low-income customers goes toward electricity.[5] In some areas of the country with rapidly rising housing costs, as the percentage of income spent on energy remains the same, but housing costs rise, there is even less to spend on the other basic necessities of life, such as food and medical care -- the costs of which are also rising faster than incomes. These trends are exacerbated by the decline in income support benefits due to so-called "welfare reform".

A number of studies make the connection between the inability to pay utility bills and homelessness, as well as the connection between the loss of central heat and increased heart disease, between malnutrition and the heating season, and between utility shut-offs and children being placed in foster care.[6] Heat stroke is a significant danger to a frail, elderly person. A sickly low-income child is put at risk by a system that requires a parent to choose between nutrition and electricity for refrigeration.

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[3] "Energy and the Poor -- The Forgotten Crisis", National Consumer Law Center, Boston, MA, 1989.

[4] Id.

[5] "Low-Income Energy Policy in a Restructuring Electricity Industry: An Assessment of Federal Options", Lester W. Baxter for Oak Ridge National Laboratory, ORNL/CON-443, July 1997.

[6] Many of these reports are summarized in Howat and Oppenheim, "Analysis of Low-Income Benefits in Determining Cost-Effectiveness of Energy Efficiency Programs" (National Consumer Law Center, 1999), which is Attachment 4.

The high energy burden faced by low-income customers has led many to fall behind on their utility bill payments, often resulting in high levels of arrearages, collection actions by the utility, payment negotiations, service terminations, and reconnections -- all costly to the utility and all other customers. In order to alleviate this high energy burden on low-income consumers, and to save substantial costs to other customers, many states have instituted programs to make energy more affordable. In most cases, other customers of the utilities have supported these programs, once they have been informed of the costs and benefits of them -- both to the customers who benefit directly and to all other customers because of reduced utility costs. For example, in South Texas, when asked their level of support for the principle of keeping electricity affordable to all on a scale of 1 to 10, where 10 is the highest level of support, commercial and industrial (C/I) electricity customers supported the principle at a level of 8.3. Residential customers supported it at a level of 8.5. Support also ran high for providing a special discounted rate and energy management programs for low-income customers: 7.4 for C/I customers; 8.0 for residential.[7]

If a state determines that the energy burden borne by a percentage of its citizens requires action by the state through utility discount and/or energy conservation programs, the state should articulate a clear policy rationale and goal for the program. The goal of universal, reliable service at affordable rates recognizes that energy is a basic necessity, and that low-income customers are rightfully entitled to this necessity. This policy recognizes also that benefits accrue to all customers and to society as a whole when the poorest members of society have access to affordable energy. Once the policy rationale has been articulated and goals for the programs set, funding should be assured at a level that will support the programs for as long as they are necessary. We describe on the following pages the cost-effectiveness of programs designed to lower the energy burden faced by low-income customers, some program designs that have been instituted in other states, and results in those states where they have been evaluated.

[7] Central Power and Light Company's poll of commercial/industrial and residential customers in a self-administered questionnaire given at a Texas Town Meeting on Electricity Issues, Texas A&M University Center for Instruction, May 31-June 2, 1996.

COST-EFFECTIVENESS AND BENEFITS TO UTILITIES AND NON-PARTICIPANTS

While many states have instituted payment assistance and energy efficiency programs to help lower the energy burden faced by the most vulnerable citizens, most cost-effectiveness analysis has been conducted on efficiency programs alone, or on combined efficiency and assistance programs. However, the economic principle is the same: if you lower the amount a low-income customer must spend for energy, that customer will be better able to pay the energy bill, thereby saving all other customers the utility costs enumerated above.

Howat and Oppenheim surveyed the considerable amount of research that has been conducted to identify and quantify the non-energy benefits of low-income payment assistance and efficiency programs.[8] Where possible, their paper computes those non-energy benefits as a function of the value of energy saved. The result is justification for an "adder" that can be used in cost-benefit calculations. Eleven Massachusetts gas and electric utilities, together with nine other parties, filed that paper in 1999 as part of a package justifying a cost-benefit calculation that adds together all the benefits that energy efficiency programs create. These benefits, in addition to energy savings, include low-income-specific benefits such as:

- benefits to the utility and to non-participant ratepayers, including arrearage reduction and reduced costs of collection, termination, and reconnection;
- benefits to taxpayers, including reduced costs of fire and health departments, homeless shelters, and Medicaid funds, as well as increased property values that generate real estate taxes;
- benefits to low-income families, including less frequent moving costs, fewer utility disconnections, and improved health; and
- the benefits to society of an increase in equity.[9]

The 11 utilities agreed that these non-energy low-income benefits amounted in value to at least 50 percent of the energy benefits.[10] The 11 Massachusetts utilities that agreed to the 50 percent "adder" also agreed that environmental and economic

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[8] "Analysis of Low-Income Benefits in Determining Cost-Effectiveness of Energy Efficiency Programs," Attachment 4.

[9] As noted above, surveys show consumer willingness to pay small amounts monthly to support low-income families. *E.g.*, note 8 above. Willingness to pay for such public goods is markedly greater when it is known that all are contributing.

[10] The Department of Telecommunications and Energy declined to adopt one 50 percent adder across the board, but it ruled that most of the benefits enumerated should be set out on a utility-by-utility basis. DTE 98-100 (1999).

development benefits[11] amount in value to an additional 25 percent of the energy benefits, for a total benefit from low-income efficiency programs of 1.75 times the energy savings.[12]

In their latest efficiency plan filings, the major Massachusetts electric companies computed benefit:cost ratios (BCRs) of their low-income programs[13] -- relying on only some of the benefits set out in the Howat and Oppenheim paper – of as much as 2.8.[14] This means that the utilities found the dollar value of the benefits of their low-income efficiency efforts were as much as nearly triple the cost of those programs.

There is little doubt that even assistance programs alone provide similar benefits to non-participants by making it more possible for low-income customers to pay their bills. Research that has been conducted on assistance and efficiency programs indicates that they both have a proven effect on payment-related costs that would otherwise be paid through rates by all other customers. For example, a Pacific Gas & Electric study found reduced carrying costs on arrearages of $4 to $63 per weatherized household, or up to 8.8 percent of program cost.[15] Another 2.1 percent or more is saved on utilities' administrative costs of collection, including termination and reconnection.[16] Introduction of an efficiency program in Colorado brought a drop in arrearages of 26 percent and in uncollectibles of 18 percent. The latter represented

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[11] Many studies show the economic development benefits of utility-funded demand-side management or energy efficiency programs. Job growth occurs from funds directly spent as well as from multiplier effects. This increased economic activity also generates increased state and local tax revenue. *E.g.*, Goldberg and Laitner, "Energy Efficiency and Renewable Energy Technologies as an Economic Development Strategy for Texas" (Texas Dept. of Economic Development 1998); Laitner and Bernow, "Employment and other macroeconomic benefits of an innovation-led climate strategy for the United States," 26 Energy Policy 425 (1998); Galvin, "Examination of Components of an Environmental/Economic Benefit Adder" (Optimal Energy 1999).

[12] Twenty parties (Action, Inc. *et al.*), Joint Motion for Approval of Proposed Guidelines Regarding Cost Effectiveness, Monitoring and Evaluation Issues and Shareholder Incentives, filed in Mass. DTE Docket no. 98-100, April 14, 1999.

[13] A description of the Massachusetts programs is Attachment 2.

[14] NStar (BCR of 2.1), Massachusetts Electric Co. (a subsidiary of National Grid USA) (1.94), and Western Massachusetts Electric Co. (a subsidiary of Northeast Utilities) (2.8). Utility-specific determinations of cost-effectiveness are pending at the Department as of the date of this report.

[15] Skumatz and Dickerson, "Extra! Extra! Non-Energy Benefits Swamp Load Impacts for PG&E Program!" 1998 Summer Study on Energy Efficiency in Buildings Proceedings at 8.301 (American Council for an Energy Efficient Economy 1998).

[16] Berry *et al.*, Progress Report of the National Weatherization Assistance Program at 38, 45 (Oak Ridge National Laboratory 1997).

8.5 percent of program costs.[17] These savings to all ratepayers can thus alone amount to almost 20 percent of program costs before any energy or other savings are counted.

The Ohio Department of Development's Office of Energy Efficiency contracted with five independent evaluators between 1996 and 1998 to thoroughly analyze Ohio's weatherization program. These analyses found that the program not only reduced energy consumption and corresponding bills, but it also had a positive effect on payment behavior, customer health and safety, environmental impacts, and the state's economy.[18] For example, disconnections were cut 38 percent, collection actions ten percent.[19] Similarly, Pennsylvania's low-income efficiency programs led to an increase in the proportion of bills paid by as much as 38 percent.[20] An efficiency program in Kentucky reduced shut-off notices, and shut-offs, by 23 percent; late payments by 15 percent; and non-payments by eight percent.[21] At Boston Gas, 76 percent of participating efficiency customers had trouble paying their bills -- 60 percent of those payment-troubled customers found it easier to pay their bills after participating in the efficiency program, with half (30 percent) now able to pay their entire bill.[22] On average, consumption savings from this program are 16 percent.[23]

Adding an education component to the delivery of energy efficiency services to low-income customers can increase energy savings and, therefore, the cost-effectiveness of the program. A study conducted by the Alliance to Save Energy of a program implemented by the Niagara Mohawk Power Company found the following results:

> Customers who received education along with energy efficiency services showed energy savings greater than 25 percent of their usage in the first year after the installation of efficiency measures, and over 20

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[17] Magouirk, "Evaluation of Non-energy benefits from the Energy Savings Partners Program," 1995 Energy Program Evaluation Conference at 155.

[18] "Ohio's Weatherization Assistance Program: An Independent Evaluation", by Proctor Engineering Group, Tellus Institute, and Residential Building Analysis, 1996-1998.

[19] Blasnik, "Impact Evaluation of Ohio's Home Weatherization Assistance Program" at 37 (Proctor Engineering Group 1999).

[20] Pennsylvania Public Utility Commission Bureau of Consumer Services, "Low Income Usage Reduction Program" at 10 (1995).

[21] Blasnik, "Impact Evaluation of Louisville Gas & Electric Co.'s Energy Partners Program" (Proctor Engineering Group 1997).

[22] Megdal & Associates, Process Evaluation of the Demand-Side Management Residential Low-Income Energy Savings Program, submitted to the Boston Gas Co., at 15 (1998).

[23] Megdal & Associates, Cost-Effectiveness Analysis of the Demand-Side Management Residential Low-Income Energy Savings Program, submitted to the Boston Gas Co., at 8 (1998).

percent three years later. These results were compared to those found for a group that had received only the energy efficiency services: 16 and less than 13 percent of usage after one and three years, respectively.

Thus, providing education in the optimal use of appliances and other energy end uses (including lighting and water heating) added between 7 and 9 percent to the total energy savings achieved.

A study performed by the American Council for an Energy Efficient Economy (ACEEE) confirmed that education was a valuable component of energy efficiency programs, both for the customers and for the implementing contractors. The value of education in low-income programs was verified in a 1990 study cited in the ACEEE research which evaluated programs in Pennsylvania, Ohio, Michigan, and Washington.[24]

Evaluations of assistance programs show similar results. Columbia Gas of Pennsylvania operates a percentage-of-income based (PIPP) assistance program together with arrearage management and efficiency. Participants' arrearages fell 18 percent, disputes by 61 percent, new payment agreements by 53 percent, and cancellation of payment plans by 69 percent.[25] At Louisville Gas & Electric, a PIPP and weatherization program led to a 39 percent drop in shut-off notices and a shut-off rate that decreased 84 percent.[26] When Niagara Mohawk Power Corp. negotiated low-income payment plans with a realistic view of the payments low incomes can support, cash coverage of bills by program participants rose 12 percent; customers with the worst previous payment records had the best improvement: 36 percent.[27] An Equitable Gas Company PIPP and weatherization program in Pennsylvania led to missed payments dropping by more than two-thirds and low-income bill payments rising from 50 percent to 63-to-69 percent, an increase in collections of at least 26 percent.[28]

In addition, taxpayer-supported expenditures are saved by reductions in low-income consumer demands for such services as medical care,[29] fire calls due to the use

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[24] "Energy Efficiency Programs for Low-Income Households: Successful Approaches for a Competitive Environment", conducted by Miriam Pye for ACEEE in August 1996.

[25] A & C Enercom Inc. *et al.*, "Final Report: Process and Impact Evaluation Customer Assistance Program" at iii, 11, 13, 18-19.(1996).

[26] Meyer and Curry-White, "The Affordable Energy Corporation's All Seasons Assurance Plan at 59 (1994?).

[27] Response Analysis Corp., "Niagara Mohawk Power Corp.'s Affordability Plan" at 4 (1996).

[28] Scan America *et al.*, "Impact Assessment of the Equitable Gas Co. Energy Assistance Program" at 46, 112 (Scanada Consultants Ltd. *et al.* 1996).

[29] Skumatz, above, at 8.307.

of dangerous alternative heat sources,[30] and homeless shelters.[31] Further, by contributing to housing maintenance and helping to prevent housing abandonment and homelessness, efficiency and assistance programs contribute to the maintenance of a community's real estate tax base.

In these ways, low-income assistance and efficiency programs have been found to virtually pay for themselves. As the Equitable Gas evaluation explained:

> Equitable's Energy Assistance Program (EAP) is probably best viewed as a business product. While it is true that EAP offers significant benefits to customers who meet its conditions, it is not a benefit program.... EAP is a practical arrangement designed to be mutually beneficial to the participant, to Equitable, and to other customers....
>
> The pricing model which underlies EAP is a variant of the kind of negotiated rate which many utilities set for a large industrial customer which might leave the system. This is, in fact, the precedent for pricing which does not fully cover costs, but yet [does cover marginal costs and make a contribution to fixed costs].[32]

Three years ago, Brooklyn Union Gas added home study courses and individualized customer services to its efficiency, heating system repair, and arrearage management programs. Courses include ongoing lessons in budgeting and energy management. Individualized services include payment plans, referrals and advocacy to obtain assistance, and individual follow-up. Payments from three-year participants are fifty percent higher than at the start of the program. In fact, in three years this group of customers has changed from 100 percent payment-troubled to 60 percent with no collection activity whatsoever and 80 percent with only one reminder per year (the Company's average). The cumulative benefit in receivables in three years has been $14.4 million at a cost of about $3 million.[33]

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[30] Berry, above, at 38, 39.

[31] Robinson, "An Examination of the Relationship Between Utility Terminations, Housing Abandonment and Homelessness" at 1,2 (eight percent of homeless respondents cite utility cut-off as the cause; 32 percent of electric and 24 percent of gas cut-offs led to abandonment within one year) (Energy Coordinating Agency of Philadelphia 1991).

[32] Scan America *et al.*, above, at 30-31.

[33] Personal communication, James Jacob (manager, consumer advocacy division), Brooklyn Union Gas (Oct. 1, 1999); Mary Grassi and James Jacob, Keeping Customers "On Track" (presentation to National Low Income Energy Consortium Conference, 1999); Jim Yardley, "The Gas Company as Social Worker: Brooklyn Union Tries Softer Approach to Pursue Unpaid Bills," New York Times at 35 (Jan,. 17, 1999); evaluation letters to New York Public Service Commission (1997, 1998, 1999).

AFFORDABILITY

Discounts

No two states have implemented utility bill discounts in exactly the same way; there are even great variations within a single state among different utility companies. Each state or utility has assessed the needs and circumstances of its customers, the number of affected customers, the effect on other customers, and the political will to provide relief before designing the chosen program. Some programs apply to only electric or gas companies; others apply to both. Some states have had discount programs in place for many years (Massachusetts for at least 20 years) and others have instituted them with electric industry restructuring (Texas codified statewide discounts in 1999).

While there are many variations in the details, there are three basic types of discount programs:[34]

- Fixed percent of bill;
- Fixed dollar discounts; and
- Discounts that vary with usage

The fixed percent of bill design has resulted in discounts ranging from seven to 40 percent, depending on the state and utility company (*e.g.*, California's is 15 percent; Massachusetts discounts range to close to 40 percent for electricity and up to 40 percent for gas). One way some states have structured the discount is to waive the tax on energy, which is by nature a fixed percent of the bill. In a small number of states, the discounts apply only during the costliest part of the year (*e.g.*, West Virginia provides a 20 percent discount in the winter months).

Other states provide a fixed dollar discount, most typically by waiving the customer charge for low-income customers (*e.g.*, Alabama, $7.65 per month; Mississippi, $8.65, New York customer charge frozen at $5.00 while for other customers it rises to $10.00). Others provide a fixed credit amount that has been determined in a rate case to be sufficient to the state's purposes (*e.g.*, New Jersey, up to $18.75 per month).[35]

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[34] See generally National Consumer Law Center, Access to Utility Services, 1998 Supplement, App. B, attached as Attach. 1.

[35] Note that, where customer charges are very low, waiver of the customer charge would have little benefit, and a larger fixed dollar amount is therefore more appropriate.

A percentage discount may also vary with a customer's usage, as in the original California Lifeline rate. This could take the form of a discount that applies only to a lifeline block -- *i.e.*, the minimum amount of electricity deemed to be necessary to sustain life in today's society. Usage beyond this amount is priced at the regular residential rate. Thus, for example, usage up to 500 kilowatthours (kWh) per month in Minnesota is discounted 50 percent. In the District of Columbia, a 28 percent discount is applied to the first 400 kWh per month. Alternatively, the discount could decline, but still exist, as usage increases. Thus in Arizona the discount is 30 percent for usage at or below 400 kWh per month, 20 percent on usage between 401 and 800 kWh, 10 percent on usage between 801 and 1200 kWh, and there is a $10 credit for higher usage.

Another rate that results in a discount that varies with usage is the inverted block rate, adopted in California and other states at various times. In an inverted block rate, blocks of kWh consumption are established such that greater levels of consumption are charged higher unit costs.

The most obvious virtue of the fixed percentage and fixed dollar discounts is that they are simple for the utility to administer and for customers to understand. On the other hand, a discount that varies with usage is preferred by some because it encourages conservation -- or at least does not encourage consumption. (A fixed dollar discount shares this effect to some extent since the percentage discount declines as consumption increases.) However, these effects are probably very small, if not zero, because the elasticity of low-income demand is very small; *i.e.*, low-income consumers have so little income relative to their needs that decreasing the price of one necessity tends to result in larger consumption of another scarce necessity rather than an increase in discretionary consumption.[36]

Different discount strategies tend to target different sectors of the low-income population. Thus a fixed dollar discount, and discounts that vary directly with usage, tend to benefit most those electricity customers with the lowest incomes, to the extent that electricity consumption is correlated with income.[37] Fixed percentage discounts

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[36] Robinson and Chalfant, "Economic Revitalization Through Energy Conservation" at 19 (The Energy Coordinating Council of Philadelphia, 1993).

[37] For example, an Argonne National Laboratory study, based on U.S. Department of Energy national consumption data by income, found that the poorest quintile used 26 percent less electricity than average while the richest used 24 percent more than average. The poorest quintile used only 14 percent less natural gas, while the richest used 25 percent more. Poyer and Allison, Energy Consumption and Expenditure Projections by Income Quintiles on the Basis of the Annual Energy Outlook 1997 Forecast at 7 (1998).

There is a range of estimates for residential electricity price elasticity, with many studies showing very little price responsiveness irrespective of income. The range is -0.05 to -0.80 (short-run) and -0.30 to -4.54 (long-run); *i.e.*, a one percent increase in price leads to the indicated decrease in demand. EPRI, TR-105045 at 197 (1997); Laurits R. Christenson Assocs., "Customer Price Responsiveness," EPRI

better reach low-income households with high consumption that is not within their control, such as those with electric heat, large families, or exceptionally wasteful landlord-provided appliances.

Discounts that vary seasonally recognize the sharp differences in consumption that exist in certain climates and are thus designed to contribute to simplifying low-income budgeting. They are not appropriate where an energy utility use does not vary greatly by season (*e.g.*, electricity in New England, where there is little low-income electric heat).

There is probably little difference among all these discount strategies in the predictability of their financial impact on all other customers since the number of low-income customers and their consumption tend to be similarly stable. The least predictable variable is usually the penetration of the rate; *i.e.*, how successful outreach efforts will be. This depends on such variables as the penetration of a state's federally-funded Low Income Home Energy Assistance Program (LIHEAP), the penetration of other benefit programs, the fraction of low-income consumers in master-metered buildings or group living situations (group homes, nursing homes, and the like), the nature of the low-income population, the nature and extent of outreach efforts, and the presence of income self-declaration or automatic sign-up mechanisms.

Because the costs of discount programs are small relative to rates,[38] they are usually recovered on a per-kWh basis.[39] Generally, rates are established on the basis of a predicted cost based on historical experience and other known parameters, and are reviewed periodically as part of general rate cases. Costs are usually recovered from all customers, on the principles that all customers benefit from the consequent cost reductions and that all customers share the social obligation to assist low-income families.

Retail Electricity Book. A value of less than 1.0 is considered inelastic. In any event, it is clear that electricity consumption varies to some extent with income. Results are 0.30- 0.61. D. Chapman *et al.*, "Electricity Demand Growth and the Energy Crisis, Science, Nov. 17, 1972; R. F. Halvorsen, "Residential Demand for Electricity," Ph.D. Dissertation, Harvard Univ., Dec. 1972.

The correlation between income and gas usage is smaller because many low-income families live in substandard, poorly weatherized homes that require excessive consumption of gas to heat.

[38] The typical funding level among the states is about one mill per kWh for affordability and efficiency combined.

[39] However, the Illinois restructuring statute provides for a per-meter charge for gas and electricity that is graduated by customer size (*i.e.*, residential customers pay $0.40 per meter per month, small businesses $8.00, and large businesses $600.00). There is as yet no operational experience with this mechanism.

Income-Based Programs

A type of payment program that is increasing in use is the percentage of income payment plan (PIPP). This type of program takes the energy burden of low-income customers strictly into account and structures a payment program such that the burden faced by these customers will be no higher than a predetermined percentage of their income. The percentage chosen varies by state and may bear a direct relationship to the burden borne by customers of average income in the state (*e.g.*, it could be designed so that the energy burden for low-income customers is no more than twice the burden for other residential customers).

As with discount programs, PIPP programs vary widely depending on the state and/or utility company. The percentage of income also varies with whether the utility is used for heat. Some utilities use income brackets to determine the percentage; others use income brackets and level of consumption; still others apply a fixed percentage for all eligible customers. Attachment 1 is an appendix to the NCLC report "Access to Utility Service/1998 Supplement" that summarizes the variations of both discount and PIPP program designs that had been adopted by various states by the date of the publication. In general, the range is four percent to 15 percent of income, as illustrated by these examples:

Pennsylvania PIPPs vary by utility, but Columbia Gas and Duquesne Light are typical. In each plan, the fraction of income paid depends on the level of poverty (expressed as a percent of the Federal Poverty Level, or FPL). Duquesne offers both a PIPP and a percent-of-the-bill discount option, which also varies with income. Thus:

FPL	Columbia PIPP	Duquesne PIPP or Discount	
0-50%	5%	5%	50%
51-100%	7%	7%	30%
101-150%	9%	9%	20%

Columbia forgives a quarter of an arrearage for every 12 months of successful participation; Duquesne forgives one-twelfth each three months.

Some electric utilities with a PIPP (Pennsylvania Electric Company, Metropolitan Edison) distinguish between use for heat (9 percent, 10 percent, 15 percent of income) or non-heat usage (4 percent, 5 percent, 6 percent). The state-wide Ohio plan distinguishes between primary heating service (10 percent of income) and secondary (5 percent). The state-wide Ohio plan distinguishes between primary heating service (ten percent of income) and secondary (five percent).

At Central Maine Power, a similar result is achieved by varying the percentage of income with electricity usage, as follows:

	Below 75% FPL	Above 75% FPL
<5000 kWh	6%	7.1%
5001-13,999 kWh	(([usage minus 5000]/9000)*5%) + 6%	
e.g., 9500 kWh	8.5%	
14,000 kWh+	11%	12.1%

PIPP payments can be made directly by an agency from which a customer is receiving other benefits (such as SSI or transitional assistance), but a major issue for low-income customers (especially elderly customers) is pride and control over their lives. By giving control to another entity, the utility (or the state) would take away part of the motivation a customer feels to pay his or her bills. It also undermines any financial and energy education provided to the customer if the customer has no control over whether the bill is paid. This type of education is a critical component of enabling the customer to better manage energy use and to budget the limited income available in the most effective way. In fact, as described below under Arrearage Management, budget counseling may be one of the most effective components of an overall arrearage reduction strategy. As described above, PIPPs are often coupled with Arrearage Management on the basis of a fractional forgiveness for each month of successful participation in the PIPP.

PIPPs obviously require an additional commitment of administrative resources, but by showing low-income customers that there is a practical way for them to do what they want to do -- pay their bills -- PIPPs have succeeded in reducing arrearages and consequent collection and termination costs. Columbia Gas, for example, found reduced arrearages and improved payments. West Penn Power also found reduced arrearages and confirmed that participants paid more than their variable costs so they contributed to fixed costs. Pennsylvania Power & Light found improvements in payment frequency and decreased account management costs. All studies found no increase in consumption.

Arrearage Management

A crucial component of many discount and PIPP programs is arrearage forgiveness. While low-income customers do not constitute the customer class with the majority of arrearages,[40] low-income customers are usually in arrears because they cannot afford to pay their bills -- not because they do not want to pay.[41] Indeed,

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[40] M. Quaid and S. Pigg. "Measuring the Effects of Low-Income Energy Services on Utility Customer Payment Behavior," Proceedings of the 1991 Fifth International Energy Program Evaluation Conference, 1991.

[41] *E.g.*, Ron Grosse, "Win-Win Alternatives to Credit & Collections", Wisconsin Public Service Co., 1997.

half of all customers fall behind on utility bills because they do not have enough money due to such causes as unemployment and medical bills.[42] Thus, if the bills are made more affordable, experience demonstrates that low-income customers in general will pay more of their bill. As arrearages grow, low-income customers are apt to become fearful of ever getting out from under their debt; thus, increasing the late payment penalty, disconnecting the customer and then charging a reconnection fee, or setting a payment plan in place that requires more than the customer is able to pay, are unlikely to generate much incremental revenue from the low-income customer with a high arrearage. In fact, that customer is likely to become discouraged and to stop making any payments at all.

Utility companies in various states have structured arrearage management programs in different ways to meet the needs of their low-income customers. As programs provide arrearage forgiveness coupled with other discounts, energy conservation, education and budget counseling, low-income customers with large arrearages are removed from the collections rolls, and collection staff resources can be devoted to going after those in arrears who have the money but have not paid their bills for other reasons.

Arrearage management programs are based on the premise that, although low-income customers cannot afford to pay the entire energy bill, they can pay (and are willing to pay) something toward their bill each month. The amount may be negotiated and based on what the customer agrees is affordable, based on an analysis of income and expenses. In a program instituted by the Niagara Mohawk Power Corporation (NMPC), customers enrolling in its arrearage forgiveness program had to have a negative cash flow to participate in the program; *i.e.*, their expenses (including utility bills) were greater than their incomes.[43] Payments were negotiated based on percentage of income, and customers were required to apply for LIHEAP and state crisis money. Several goals were set for the program:

- Increase the regularity of cash payments by participating customers;
- Increase the total amount of cash payments by participating customers;
- Increase the use of available assistance by participating customers;
- Decrease the number of collections actions for participating customers;
- Eliminate arrears for participating customers.[44]

According to the evaluation of the NMPC arrearage program, the program was successful in increasing both the number and amount of cash payments; it was not

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[42] Matousek and Radue, "Wisconsin Public Services Corp. Lifestyles II" at 25 (Matousek & Assocs. 1993).

[43] Niagara Mohawk Power Corporation Affordable Payment and Arrearage Forgiveness Program Evaluation, prepared by Response Analysis Corporation, Princeton, NJ, May 1992.

[44] Id.

successful in increasing the use of available assistance payments; it did reduce the number of collections actions; and, for those who remained active in the program (despite limited follow-up by the company), arrearages were reduced by 50 percent. The evaluation concluded that, with greater support from the company and other improvements to the program design, more participants could have reduced arrearages and the program would have been cost-effective compared to the prior system of collections and disconnects.[45]

The Pennsylvania experience with arrearage forgiveness programs combined with PIPP programs is described above under "Income-Based Programs". The experience of Brooklyn (N.Y.) Union Gas is described below under "Education".

Connecticut Light & Power Company, a subsidiary of Northeast Utilities (NU), has an arrearage management program called "NU Start" that is available to customers with incomes below 200 percent of the federal poverty level. The customer's total arrearage is divided into 12 even amounts; a payment plan for current bills is worked out; the customer is given budget counseling and energy education; she is referred to the weatherization and energy conservation program for all applicable measures to be installed. For each month that the customer makes a payment according to the agreed-upon schedule, a month's worth of arrearage is forgiven. If a customer misses a payment due to unforeseen circumstances (like a medical emergency or other unforeseen event), he is allowed to begin again in the program with a new payment schedule; the arrearage is recalculated. The company has learned that this type of program is the most effective means of retaining customers and receiving some revenue from those who would otherwise have been disconnected for failure to pay.

Clark Public Utilities Company in Vancouver, Washington, instituted a "Guarantee of Service Plan" in 1988 to assist low-income customers in paying their utility bills.[46] The present plan requires customers to pay no more than nine percent of their income for electric service and includes an arrearage forgiveness component, as well as education and weatherization where applicable. The plan serves all customers with incomes up to 150 percent of the federal poverty level (some up to 175 percent), eliminates security deposits for participants, requires participation in energy assistance grant programs, exempts participants from late charges, and provides rewards in the form of "Energy Savings Certificates" for reduction in energy use.[47] The results to date of this program are as follows:[48]

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[45] Id.

[46] "Guarantee of Service Plan", p. 1, Clark Public Utilities, Vancouver, Washington, 1999.

[47] Id. pp. 2-3.

[48] Id.; Weiss, "Low-Income Assistance Pays for Itself," Northwest Energy Coalition, 1998.

- Delinquency has been reduced from 74 percent to 18 percent; write-offs have dropped 36 per cent;
- The average assistance grant has been reduced from $230 to $169;
- The average customer contribution to revenue is $55 per month, compared to $22 per month prior to plan entry;
- The average adjustment from pre-plan arrears is $227, compared to a $252 traditional average loss;
- Disconnection of service to low-income customers is down 64 percent;[49] and
- Direct annual utility benefits exceed costs by 11 percent; *i.e.*, the benefit cost ratio is 1.11.

ELIGIBILITY

Eligibility for payment assistance programs also varies by state. Some are open to only elderly and/or disabled low-income customers, but most are available to all customers for whom household income is less than a certain percent of the federal poverty level (FPL). The standard is typically 125 or 150 percent of the FPL,[50] although the state of Connecticut provides some payment assistance to customers with incomes as high as 200 percent (although Connecticut does not provide price discounts). The most typical criteria are probably 150 percent of FPL (Arizona, California, Maine, Ohio, Pennsylvania, West Virginia, Wisconsin) and receipt of (or eligibility to receive) LIHEAP (Massachusetts, Minnesota, New York). Usually the level is set to match the criterion of the state's LIHEAP. The obvious trade-off in setting the same standard for both LIHEAP and utility programs is between cost (or size of benefit) and the number of people helped. The details of this trade-off vary widely by state, depending on such factors as the relative wealth of the state, the relative size of the low-income population, rate levels, and consumption levels.

We are aware of no assistance program that includes families who are not direct customers of the utility, such as tenants in master-metered buildings (which includes certain public housing buildings) or people in nursing homes. Some utilities will extend their discount to group homes that are on a residential rate.[51] However, the principal means of providing utility energy assistance to low-income families who are not direct customers has been through efficiency programs, described below.

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[49] Id.

[50] Federal LIHEAP rules permit the cut-off to be as high as 60 per cent of a state's median income.

[51] Extending the discount to other institutions is certainly possible. The obstacles to date have probably been the additional administrative effort required and some doubt about whether the benefit would flow through to the low-income consumers.

Buildings populated by more than a designated percentage of low-income households (usually 50 percent) are provided means of controlling bills by such measures as weatherization, education, and appliance replacement.

Certification of income is rarely performed by utilities and is usually performed by state agencies.[52] One common strategy is to accept as eligible all those who can demonstrate they are receiving benefits from a program that uses an income screen that is no more generous than that of the discount program. Typically, however, this type of screening will miss some eligible customers for whom the program is intended. Some eligible customers will have decided not to avail themselves of other benefits. And some eligible customers may not be eligible for any other benefits.[53] A state or community agency can fill these gaps at minimal cost. For example, Pennsylvania utilities use community action agencies for outreach and intake.

Virtually all low-income discount programs are filed by the utilities as permanent rates, although a few began as pilot programs (particularly Percentage of Income Plans) and some started decades ago with a narrower focus (for example, the Massachusetts and Texas discounts were originally limited to SSI recipients and low-income elderly customers, respectively). The rationale for a pilot program -- to test a promising but innovative idea to see if it works -- probably no longer applies to low-income discount programs.

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[52] California relies on self-certification, which has resulted in a high penetration of the discount rate. While it is possible that some technically ineligible households qualify for the rate in this way, it seems unlikely that many families without true need would go to the trouble of declaring themselves needy.

[53] The Massachusetts electricity restructuring statute extended the low-income rate discount to those at or below 175 percent of the FPL and set as the screening device receipt of a public benefit the eligibility for which was an income of 175 percent of FPL or below or eligibility for LIHEAP (175 percent of FPL for households of one or two, 150 percent of FPL for others). The fuel assistance network (mostly community action agencies) will certify eligibility for LIHEAP, even if funds are exhausted, in order to qualify a household for the discount rate. It turned out that, for households of two or more with incomes between 150 percent and 175 percent of FPL, there are no public benefit programs. Efforts are currently underway to correct this unintended gap. This experience demonstrates the care that is needed when surrogates are used for intended eligibility standards.

CUSTOMER PROTECTIONS THAT ENHANCE ABILITY TO PAY

States have adopted many protections that make it easier for customers to pay their utility bills. In one form or another, these protections are universal across the country, although details vary.[54]

Credit and collection

States regulate deposits, late charges, and reconnection fees, in some cases prohibiting them. Where allowed, they are restricted. For example, late charges and reconnection fees, if allowed, must generally be based on cost (for late charges, this is rarely found to be higher than one percent or 1.5 percent per month). Deposits, if allowed, are generally limited in size and to those who cannot establish credit any other way.

In most states with long periods of extreme weather causing large seasonal changes in utility service consumption for heating and/or cooling, levelized billing plans are provided to make it possible for customers to budget the same payment each month. A true-up adjustment is made at least annually. Some states allow customers to choose the date each month that they would prefer to have their bills come due, thus letting customers align bill payment with revenue streams. Similarly, many states provide for deferred payment arrangements of arrearages. As described above, in some states these arrangements are coupled with arrearage forgiveness and discount plans. In any event, the most successful programs tailor the payments in some way to make it more likely that the customer will be able to make the payments.

Most states recognize situations where the need to protect the most vulnerable mandates that disconnection for nonpayment not be allowed. Budget counseling and payment arrangements can be effective in making payment possible in these difficult situations. The shut-off moratorium conditions include:

- extreme weather;
- medical emergencies and serious medical conditions; and
- presence of elderly people or infants in the home.

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[54] See generally National Consumer Law Center, Access to Utilities, chps. 3 and 6 (shut-off protections), 4 (credit and deposits), 5 (late charges and payment plans), 9 and 10 (landlords).

Rates

In addition to the low-income-specific rate discounts discussed above, some states have taken steps to reduce the energy burden on all residential customers. In high-cost states, the overall rate level is an obvious factor making it difficult for low-income families to pay their bills. The legislatures in many such states have required rate cuts for all customers as part of the restructuring of their electric industry. Sometimes related to this is the large (and sometimes increasing) discount in some states that industrial customers receive vis-a-vis residential rates.[55] In Connecticut, for example, this differential has been frozen by statute.

Other protections that affect payment

Most states require regular meter reading and many states restrict a utility's right to back-bill when it has failed to read a meter for a lengthy period of time. At a minimum, such states usually allow as much time to pay the back bill as it took the utility to read the meter. In addition, many states abate the bill on the theory that consumers could have adjusted their usage had they only known what the bill was.

Most states, through both utility regulation and (at least arguably) through unfair and deceptive trade practices statutes, require disclosure to each customer of the most favorable rate available to him or her.

In many states, upon the failure of a landlord to pay a utility bill, tenants must be notified and given the opportunity to take over responsibility for the service, adjusting their rent payments accordingly.

In some states, customers with billing arrearages (or those who request help in managing their budgets through levelized billing or other mechanisms) are referred to other forms of assistance by the utility, such as fuel assistance, telephone Lifeline rates, gas company discounts, or even transitional assistance programs. Any form of assistance that can lower the total household financial burden contributes to the payment of utility bills.

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[55] J. Oppenheim, "Cap The Gap: Assuring Residential Customers Share Benefits of Electricity Industry Restructuring" (National Consumer Law Center 1999).

EFFICIENCY AND WEATHERIZATION

Purpose and Issues

In addition to payment assistance and arrearage forgiveness programs, the best way to lower bills for low-income customers is to provide them with comprehensive weatherization, education, and energy efficiency services. Besides lowering their bills, these types of programs enable low-income customers to better manage their usage, making energy more affordable and thus empowering them to take better control of their finances. Several issues must be considered when these types of programs are designed, a few of which are listed below:

- How should the program be designed? What measures should be included?
- Should a co-payment be required from the customers? (Usually this practice has been found to be self-defeating.)
- Should the program be fuel-blind; *i.e.*, should the electric company provide weatherization services to customers who heat their homes with oil or gas?
- Should services be delivered by the utility, by community service agencies with closer ties to the target population, or through an energy services company? Is there a trained, high quality, stable staff and infrastructure on which to build a program?
- Should the eligibility level for efficiency programs be the same as for payment assistance programs, or can it be more generous?
- Should services be offered to all eligible low-income households or just those with usage over a certain threshold? Should you begin with a threshold and lower it as the program matures?

Program Design

The low-income population is a sector within the general residential class with unique barriers to participation in energy efficiency programs; thus, program designers must plan accordingly. It is equally important to standardize a set of measures and auditing tools for the chosen implementers in order to reduce training needs and speed installation time. The Massachusetts low-income programs illustrate these tenets. Attachment 2 is a summary of the Massachusetts low-income utility efficiency programs as filed in their energy efficiency plans and approved by the regulators.

In the early years of utility companies' providing energy efficiency services to low-income customers, the "neighborhood blitz" approach was widely used. This approach entailed a team of installers going to a particular neighborhood (after

providing notice a week before) and knocking on doors to install conservation measures. While there was some success from this approach early on, targeted neighborhoods were soon saturated with those households who would allow entry.[56] Savings from measures installed in the blitz were often small and difficult to evaluate. There was no education provided, and no follow-up was conducted.

For the past several years, the trend has been to provide customized audits in previously scheduled visits, along with education, refrigerator metering (to determine energy use for possible replacement), and installation of all measures that can be installed at the time, with appointments scheduled for any further work necessary (such as ceiling, wall or floor insulation). A blower door test is conducted to determine the need for insulation and/or air sealing.[57] In the Appliance Management Program described below, one team of contractors can complete three comprehensive audits each day. The teams are sent and managed by the local community action agencies who also perform weatherization under the DOE program.[58] In other words, the efficiency program is "piggy-backed" onto a previously existing network of experienced administrators to minimize costs and maximize efficiencies. Indeed, an important feature of most successful programs is to coordinate (piggyback) among all resources available to a particular home, including electric and gas utilities, the U.S. Department of Energy Weatherization Assistance Program (DOE WAP), and state funds.[59]

Massachusetts Electric Company runs a relatively aggressive low-income base-load efficiency program (the Appliance Management Program or AMP) that includes

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[56] United Illuminating Company in Connecticut is still implementing a neighborhood low-income program in addition to – not instead of – a program "piggy-backed" onto the DOE weatherization program and implemented by the CAP agencies. Connecticut Light & Power Company has agreed to pilot such a neighborhood program beginning in 2001 in order to comply with a CPUC directive for the two IOUs to implement the same programs for residential customers throughout Connecticut.

[57] For discussion of program design, see Brown *et al.*, Utility Investments in Low-Income Energy-Efficiency Programs (Oak Ridge National Laboratory 1992); Spade and Brockway, A Guide to Low-Income Energy Efficiency (National Consumer Law Center 1996); Pye, "Energy Efficiency Programs for Low-Income Households: Successful Approaches for a Competitive Environment" (summary of seven utility programs) (American Council for an Energy Efficient Economy, 1996); Brockway *et al.*, Approaches to Electric Utility Energy Efficiency for Low Income Customers in a Changing Regulatory Environment (utility programs in seven restructuring states) (Oak Ridge National Laboratory 1998).

[58] For a discussion of the Weatherization Assistance Program (WAP) network, including community action agencies, see Mihlmester *et al.*, Characterization of the Weatherization Assistance Program Network (Oak Ridge National Laboratory 1992).

[59] A newly designed community-based energy efficiency program that will be implemented as a pilot by the Northeast Utilities and United Illuminating Companies in Connecticut in 2001 will attempt to coordinate efficiency services to low-income customers within a selected community with the local lead-abatement program.

replacing refrigerators and that achieves an average reduction in energy use of 15 percent.[60] The U.S. DOE's 17-state meta-evaluation of weatherization programs found a 23 percent reduction in natural gas consumption, with a 34 percent reduction in consumption of natural gas for space heating.[61]

Appliance Management Program

The AMP combines comprehensive energy education with weatherization and energy conservation services to low-income customers. This program was formed out of a partnership between Massachusetts Electric Company and the local weatherization and fuel assistance network. It has been expanded and is now implemented by all of the investor-owned electric and most of the investor-owned gas companies in Massachusetts. The program provides an audit, a detailed appliance survey with usage data, detailed energy education about energy use and opportunities for saving energy tailored to each household's practices. All cost-effective efficiency measures are installed at no direct cost to the building occupant, including insulation, lighting, new refrigerators, waterbed replacement or insulation, and low-flow showerheads and faucet aerators. In 1997 alone, average savings per participant were 1,386 kWh per year. Most customers were very satisfied with the program; over 50 percent said it helped them pay their bills on time; and 73 percent recognized that it helped lower their electric bill. Furthermore, participants were 15 percent more likely to be very satisfied with their local utility than were non-participants in the program.[62] In the following year, this differential rose to 19 percent (and 37 percent in neighboring Rhode Island and New Hampshire).

Efficiency Measures

Single Family Homes

Measures included in utility energy efficiency programs vary by cost-effectiveness. In general, it has been found that it is most cost-effective to determine ahead of time and prescribe the measures that will be installed in households.

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[60] Peters, Baggett, and Seiden, Process and Impact Evaluation of New England Power Service Company's Appliance Management Program (Research Into Action 1999), U.S. Energy Information Administration (1997 consumption).

[61] Berry, Brown, and Kinney, Progress Report of the National Weatherization Assistance Program (Oak Ridge National Laboratory 1997).

[62] "Process and Impact Evaluation of New England Power Service Company's Appliance Management Program", vol. 1, pp. i-ii, Jane S. Peters, Research Into Action, and Ken Seiden, Essential Economics, Inc., July 1998.

Examples of heating, cooling, and domestic hot water measures that are often included in energy efficiency programs for low-income customers:

- attic, wall, and floor insulation;
- pipe and duct insulation and sealing;
- ventilation;
- window, storm window, and door replacement;
- clock thermostats;
- other controls;
- blower door-assisted air sealing;
- hot water tank wraps;
- low-flow showerheads and low-flow faucet aerators;
- water heaters, including heat pump water heaters;
- heating system tune-ups;
- heating safety repairs and replacements; and
- solar domestic hot water systems.

Other measures that are installed to reduce electric use only include the following:

- compact fluorescent lightbulbs (CFLs);
- CFL torchieres to replace halogen torchieres;
- dedicated table lamps that accommodate only CFLs;
- energy efficient refrigerators;
- water bed covers (or replacement mattresses); and
- clothes washers (also appropriate in gas and water conservation programs).

Multi-family Dwellings

For multi-family dwellings, other measures could include common area lighting fixtures that accommodate only efficient fluorescents, insulation, air sealing, motors, controls, and energy efficient clothes washers. Issues that arise with multi-family dwellings might include the question of contributions by landlords and the eligibility of the building based on the percent of low-income tenants -- most often, if at least 50 percent of the tenants in a building are low-income, the building is eligible for services under the program.

New Construction or Renovation

For a low-income new construction or rehabilitation program, many other issues may arise that must be dealt with in order to implement a successful program:

- recognition that this is a difficult market to reach, with many barriers, but a true lost opportunity if not successful;

- provision of design assistance, training, and education on energy efficient building practices and technologies to builders of low-income housing;
- tenant or owner education on energy use and management;
- measures to be installed in new or renovated buildings:
    * building shell
    * domestic hot water
    * lighting and appliances
- payments from the utility company need only cover the incremental cost of the efficient measures compared to the cost of standard measures and practices (although larger payments may be required to leverage investment in efficient new construction or rehabilitation projects);
- assistance to builders in obtaining financing for more efficient housing;
- coordination with community-based housing efforts such as Habitat for Humanity and community development corporations.

Fuel-Blind Weatherization

For many years, when energy conservation was viewed primarily as a lower-cost resource alternative to generating electricity, electric utility companies did not offer measures that were mainly designed to save resources other than electricity. The premise was that if all ratepayers were paying for the programs through their electric rates, the programs should save only electricity, so that the cost of the electricity resource to all electricity ratepayers would be lowered. To some degree, and in many states, this premise still holds, and electric companies do not install weatherization measures that do not save electricity. However, in some states (especially in places like the northeast where many people heat with oil), regulators (and even some of the electric companies) have recognized that unless low-income homes are weatherized, regardless of the fuel used to heat them, poor people will be less able to pay any utility bills – including their electric bills. In other words, by installing insulation and air sealing measures in homes and making all energy bills more affordable, electric companies and their other ratepayers benefit directly by lowering bad debt and collection burdens. Society as a whole benefits by making housing safer and more affordable for its poorest members. Where natural gas companies implement energy efficiency programs and pay for gas-saving measures, electric companies do not pay for weatherization of gas-heated homes but do provide electricity-saving measures in those homes, such as energy efficient lightbulbs and appliances.

Thus far, there have been few programs where electric companies have actually paid for fuel switching – *i.e.*, changing out an electric heating or hot water heating system for a natural gas- or oil-fueled system – even though this would be the ultimate in saving electricity in those end uses. Most Public Utility Commissions (PUCs) have recognized that in ordering such an outcome, they would be implicitly

favoring one industry they regulate over another. However, in places like Vermont, where an independent "efficiency utility" has been created to implement the energy efficiency programs funded through utility rates,[63] fuel switching is among the measures evaluated during an audit of a home. For Cape Cod, the Cape Light Compact has submitted an energy efficiency plan to the PUC that would incorporate fuel switching as an important component of its energy saving program.[64] In both of these cases, however, the electric utilities that are responsible for collecting the revenue from ratepayers to fund the programs are not the entities that would be administering the funds nor implementing the programs; the implementing entities have a more favorable view toward fuel-switching than do the electric utilities.

Service Delivery

There has long been a debate about the most effective delivery system for utility-funded low-income energy efficiency programs. In some states, where the utility receives an incentive (or makes a profit) on successful delivery of energy savings, the utility may want to provide these services directly. In addition, in some states, the utilities have extensive experience in the delivery of efficiency services and wish to provide quality, effective service to their customers. In other states, the community action agencies that provide DOE weatherization services are the best equipped to expand their role and to deliver utility-funded services as well. In our view, the most effective model developed thus far is one where utilities work together with community agencies to provide coordinated, comprehensive energy efficiency and education services.[65]

In some states, energy efficiency service delivery to the low-income population is provided by third-party contractors – sometimes as sub-contractors to the community agencies or to the utilities.[66] Important factors to consider when determining the most effective model for a particular state or service territory are that there be a well-trained, highly qualified, stable staff and infrastructure to deliver services, and that the chosen implementer be trusted by the community. In addition, several states have chosen to implement state-wide programs, so that consistent, comprehensive, well-coordinated energy efficiency and education services are

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[63] Personal communication with Beth Sachs of the Vermont Efficiency Investment Corporation (VEIC).

[64] Personal communication with Tim Woolf, program designer for the Cape Light Compact.

[65] See description of the Massachusetts Electric Company's Appliance Management Program, below.

[66] United Illuminating Company in Connecticut contracts out service delivery of its "neighborhood blitz" low-income program; and Vermont has formed an "energy efficiency utility" separate from its investor-owned utilities to provide services.

available to all low-income citizens within the states, through coordinated, but decentralized, delivery.[67]

EDUCATION

An important component of all of the payment assistance programs described so far -- whether discounts, PIPP, or arrearage forgiveness -- is education for affected customers. As stated earlier, most of the low-income customers with difficulties paying their bills want to pay but are unable to. Often, this inability has as much to do with lack of knowledge about budgeting as it does with lack of income. Therefore, providing budget and money management counseling along with payment assistance can greatly increase the odds of having the bills paid. Education is also an important component of weatherization and efficiency programs, teaching consumers to control their utility bills by wise usage. Indeed, as described in the cost-effectiveness section above, education increases the impact of efficiency programs by seven to nine percentage points.

Budget counseling has been provided at the same time as, and in conjunction with, payment assistance or made a condition of arrearage forgiveness. Sometimes, a utility company will have on staff community relations people who can provide budget counseling as well as other community interface activities such as outreach to human service agencies. At other times, community service agency personnel are contracted with to provide budget counseling as part of a comprehensive weatherization and energy conservation package. It is probably most effective to have both systems in place because not every customer who needs payment assistance will be eligible for weatherization, and even when they are, not every customer can be served immediately.

The most successful education materials are consistent, easy to use and understand, clear, humorous, and useful. Obviously, to maximize their value, they are provided in all of the major languages spoken in the service territory. Utilities have put helpful hints on sticky notes, refrigerator magnets, or other useful places to help reinforce the messages.

Utilities conduct workshops for local community action or other service agencies in order to disseminate consistent information. Since these agencies are often known and trusted by members of the community, this avenue is often the most effective avenue of communication to low-income families.

Another educational service that utility companies provide to better enable their low-income customers to pay their bills is information on the Earned Income Tax

[67] Massachusetts through legislation and Connecticut through regulatory directive are in the process of instituting state-wide low-income energy efficiency and education programs.

Credit (EITC). Most people who are eligible for the EITC do not even know about it and do not apply for it. Much like fuel assistance, by making this information available, companies increase their customers' ability to pay their utility bills and build goodwill for the company at the same time.

The most effective way to educate customers is as part of a comprehensive weatherization and energy efficiency audit and installation. The auditor is in the customer's home and can provide a printout with customized usage data for that customer. These data can show how much energy is used by each appliance and other use, including lighting, heating, water heating and cooling. The auditor can explain how to minimize usage and therefore save money on energy bills while also providing counseling on the best way to budget and stretch the energy dollars. The most successful education program is that designed to motivate customers, and to help give them a sense of control over their environment.

In one case study, the Alliance to Save Energy found that, in a program run by Niagara Mohawk Power Company, customers who received education along with efficiency services showed savings in excess of 25 percent in the first year and over 20 percent three years later, compared to a group that had received only the efficiency services (16 and less than 13 percent, respectively).[68] A study performed by the American Council for an Energy Efficient Economy (ACEEE) confirmed that education had proved to be a valuable component of energy efficiency programs, both for the customers and for the contractors implementing the programs.[69] The value of education in low-income programs was verified in a 1990 study cited in the ACEEE study which evaluated programs in Pennsylvania, Ohio, Michigan and Washington.[70] In a pioneering program and study, Wisconsin Public Service Company found that a cadre of Customer Assistance Advisors stabilized write-offs at half the national average while reducing disconnections 80 percent, to six percent of the national average.[71]

Brooklyn Union Gas Company (now KeySpan) instituted a program in 1995 called "On Track" that provides education as well as more comprehensive counseling services to 1500 payment-delinquent low-income customers each year. Most of the customers receive telephone counseling, money management advice, a video cassette recorder with instructional videos, and a box to help them organize their bills. They are also forgiven $400 in arrearages. A small number -- with the greatest debt -- are assigned a social worker. The program costs the company just over $1 million a year,

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[68] "Energy Efficiency Programs for Low-Income Households: Successful Approaches for a Competitive Environment", p. 23, Miriam Pye for ACEEE, August 1996.

[69] Id., p. 24.

[70] Id., p. 23.

[71] Ron Grosse, "Win-Win Alternatives to Credit & Collections", Wisconsin Public Service Co., 1997.

but the company has found that it pays for itself in reduced collections costs. Customers who receive this type of help are grateful to the company and, therefore, more likely to pay their utility bills first. Brooklyn Union thought it would take five years for the program to become self-supporting but found that they were making a profit after one-to-two years.[72]

Four years ago, Brooklyn Union Gas added home study courses and individualized customer services to its efficiency, heating system repair, and arrearage management programs. Courses include ongoing lessons in budgeting and energy management. Individualized services include payment plans, referrals and advocacy to obtain assistance, and individual follow-up. Payments from three-year participants are fifty percent higher than at the start of the program -- in three years this group of customers has changed from 100 percent payment-troubled to 60 percent with no collection activity whatsoever and 80 percent with only one reminder per year (the Company's average). The cumulative benefit in receivables in three years has been $14.4 million at a cost of about $3 million.[73]

OUTREACH

These program designs are effective only if extensive outreach efforts are undertaken to enlist participants. There are various methods of outreach available -- some more effective than others, and some effective only in combination with others. While utility companies all use bill inserts to communicate with their customers, this method by itself is not a very effective means of reaching the low-income population; it may, however, have a place in combination with media placements and other activities timed to coincide with the bill inserts.

Experience has shown that a more effective means of outreach is for the company to conduct community meetings and workshops to publicize the programs available to low-income customers. Meetings take place in places of worship, community centers, offices of local community service agencies, grange halls, and other places where the target population congregates on a regular basis. Applications for particular programs are made available at the time of the meetings, and a knowledgeable person is present to help people fill them out.

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[72] "The Gas Company as Social Worker", The New York Times, January 17, 1999.

[73] Personal communication, James Jacob (manager, consumer advocacy division), Brooklyn Union Gas (Oct. 1, 1999); Mary Grassi and James Jacob, Keeping Customers "On Track" (presentation to National Low Income Energy Consortium Conference, 1999); Jim Yardley, "The Gas Company as Social Worker: Brooklyn Union Tries Softer Approach to Pursue Unpaid Bills," New York Times at 35 (Jan,. 17, 1999); evaluation letters to New York Public Service Commission (1997, 1998, 1999).

Many fuel assistance providers make an automatic referral to the company's payment assistance and energy efficiency programs when a customer applies for the Low-Income Home Energy Assistance Program (LIHEAP). This has proven to be a good time to capture many of those most in need of assistance. Similarly, in many states, applicants for public benefits are automatically referred for utility discounts. A variant of this concept is to have customers automatically enrolled at the time they apply for any other benefit program, with an opportunity to decline; or providing a postage-paid post card for enrollment at the time of application for another benefit program.

A very effective method of outreach to those already on public benefit rolls, but one which has raised privacy concerns with some in the past, is to do a computer match for recipients of all assistance benefits programs -- participation in which makes one eligible for the company's payment, arrearage management, or efficiency programs -- and the company's customer list. The match generates a letter notifying the customer that enrollment is automatic unless the customer returns the notice, checking a box that says they do not want to participate. A computer match program operated by a third party to alleviate privacy concerns has been successful in New York State in signing up New York Telephone customers for Lifeline service.[74] A similar program, without the "negative check-off" notice, has been operating successfully at Eastern Edison Company (now part of Massachusetts Electric Company) in southeastern Massachusetts.

Connecticut Light & Power Company instituted a new type of outreach effort in the year 2000 that attempts to reach and serve customers who have other competency issues in addition to their low incomes, such that they are unable to take advantage of the energy efficiency and payment assistance programs offered by the company. Service is provided by Infoline, an information and referral resource that connects callers to appropriate human service agencies and to the utility through a toll-free telephone hot line, offers a simple screening tool for caseworkers, and does follow-up to ensure that services have been delivered and are effective. A complete description of this program (Expanded Energy Care) and of the Weatherization Residential Assistance Partnership (WRAP) can be found in Attachment 3.

Whatever the methods chosen (and there may be several used in conjunction with one another), provisions for serving the customers who respond must be in place. There is little more discouraging to a struggling family than to be given some hope of pulling out of debt only to be told that the resources are not available to fulfill the promises made.

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[74] See materials from Gerald Norlander, Public Utility Law Project (including Memorandum of Understanding between NYNEX and Department of Social Services for confidential matching program) in National Consumer Law Center, Low-Income Energy and Utility Programs: The Challenges Ahead at 261 et seq. (conference proceedings, 1995).

EVALUATION

Once any (or all) of the above-described payment assistance and energy efficiency programs have been implemented, it is critical to assess their effectiveness and value to the company, to the participants, to non-participants, and to society as whole. Evaluation methods are determined during the design of the programs, so that as the programs are being implemented, results are being tracked to ensure that the programs are meeting the goals that have been set for them.

Several types of evaluation are conducted for the kinds of programs described in this paper. The first -- and on-going -- type is a process evaluation, which evaluates program systems. A process evaluation can make sure a program is on track and being implemented effectively; that it is reaching its target population; that it is delivering the services for which it has been designed. A process evaluation can also identify areas of program implementation that need improvement before they become entrenched, so that they can be modified or eliminated. Some version of the process evaluation is undertaken periodically to ensure continued effectiveness of the program.

A second type of evaluation critical to obtaining the continued support of management, regulators, and customers who are footing the bill for efficiency programs is the impact evaluation, which measures quantitative results. There are several types of impact evaluations, including billing analyses, savings estimates based on the kWh saved from a particular measure times the number of measures installed, metering, and others. Some are appropriate for specific measures and not others; none is appropriate for all measures. The U.S. Department of Energy has conducted a number of impact evaluations of its weatherization programs which can be used as a basis on which to build new, company-program-specific results.[75]

Among the information options for evaluation are the following:

- a computerized tracking system of all installations;
- baseline assessment of current conditions;
- telephone surveys for process evaluation; and
- statistical billing analysis to measure consumption changes of participants and carefully selected controls.

Care is taken not to spend more on evaluation than is necessary in order to estimate with some level of reliability the savings achieved from the expenditure of ratepayer funds. A good rule of thumb is that the value of the information attained should be higher than the cost to attain it. For most energy efficiency programs for

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[75] See, for example, "Progress Report of the National Weatherization Assistance Program", Linda Berry *et al.*, ORNL/CON-450, September 1997.

low-income customers, no more than five percent of the budget is spent on evaluating them, with a general rule of thumb of two to three percent.

For assistance payment and arrearage forgiveness programs, as mentioned above, companies set goals -- such as a decrease in the value of arrearages or a decrease in the number of disconnects -- that can be measured at certain intervals (such as one year, two years, three years) and compared to those numbers before the start of the program. As the program matures, the goals may change, but they should continue to be measurable. While lowering the energy burden may be the primary goal, it may be easier to measure the types of decreases mentioned above in the short run. Over the long term, if a company's programs are successful, the average energy burden for its low-income customers should decrease.

Among the criteria that are subject to evaluation are the following:

- energy savings;
- non-energy utility benefits;
- societal benefits (including environmental, economic development, taxpayer);
- low-income and program participant payments and arrearages;
- low-income and program participant disconnections for non-payment and reconnections;
- low-income and program participant health and safety factors, including homelessness, transiency;
- program participation, reasons for participation and non-participation, characteristics of participants and non-participants;
- low-income and program participant attitudes toward utility and weatherization network;
- persistence of measures; and
- low-income and program participant energy burden (probably a long-term study).

CONCLUSION

Many states have assistance payment and/or energy efficiency and education programs for their customers living on low incomes, for whom the energy burden is high. There is not one single model of program; rather, each state has adopted a model that meets its own particular circumstances. Programs include direct payment assistance, arrearage management, customer protections, education, and energy efficiency and weatherization.

Studies have shown that these assistance and efficiency programs are very cost-effective when benefits to the utility, low-income customers, all other customers, and society are taken into account. They also provide a degree of social equity and are broadly supported by non-participating customers when all customer sectors pay for them.

To be successful, all of the programs require that outreach be done to enroll the most needy of a state's citizens. Outreach efforts include community meetings, utility bill inserts, media placements, and automatic sign-ups or negative check-offs.

Finally, no matter which type of program is adopted, results need to be evaluated and effectiveness assessed, although the amount spent on evaluation should not outweigh the value of the information obtained. Over the long term, if a utility company's programs are successful, the average energy burden for low-income customers should decline.

ATTACHMENTS

1. Energy Assurance Programs By State (Appendix B to NCLC, Access to Utility Services, 1998 Supplement)

2. Massachusetts utility low-income efficiency program design

3. Connecticut utility low-income efficiency program designs

4. Howat and Oppenheim, "Analysis of Low-Income Benefits in Determining Cost-Effectiveness of Energy Efficiency Programs"

5. Summary of Low-Income Assistance Programs

Attachment 1

Energy Assurance Programs By State

(Appendix B to NCLC, Access to Utility Services, 1998 Supplement)

Attachment 2

Massachusetts utility low-income energy efficiency program design

NStar Companies

IV. NSTAR LOW INCOME PROGRAMS *Draft*

Prior to the implementation of the current low income programs, Boston Edison, Commonwealth Electric and Cambridge Electric customers were served under a number of different programs.

Boston Edison

* Public Housing Authority (PHA): targeted housing authorities outside the City of Boston. Installed measures included lighting, HVAC, building shell and water heating end-uses.
* Boston Housing Authority (BHA): targeted public housing developments managed by this Authority within the city of Boston. The program installed only energy efficient lighting fixtures.
* Energy Conservation Service (ECS): has been in existence since 1980. It provides home energy audits and follow-up services to all residents of the state including low-income customers.
* Energy Fitness: offered direct installation of lighting, electric hot water measures and appliance efficiency measures primarily to elderly and low-income customers. Electric hot water measures included tank and pipe wraps. Low-flow shower heads and faucet aerators were also offered as part of the program. Appliance efficiency measures included replacing filters in air conditioners and cleaning refrigerator coils.

Commonwealth Electric and Cambridge Electric

* Green Saver IRM Program: Several multi-family low-income housing facilities were treated through this program. Measures included indoor and outdoor hard-wired lighting fixtures, refrigeration replacements and customer education.
* Energy Conservation Service: provides home energy audits and follow up services to all residents of the state including low-income customers.

Boston Edison, Cambridge Electric and Commonwealth Electric

Commonwealth Electric and Cambridge Electric began implementing their low-income programs in 1997, while Boston Edison began implementing its low-income program in 1998, pursuant to the Massachusetts Electric Industry Restructuring Act. The low-income programs are designed to ensure that the Companies fully coordinate delivery of energy efficiency services to low-income customers with the appropriate community agencies (WAPs) that deliver weatherization services for the Department of Energy. The objective of all these services is to assist low-income consumers in managing their electric use, and thereby reducing their bills, while contributing to other key energy efficiency market transformation objectives. Most products and services available are common to all low-income programs. The Companies plan to continue to provide specialized in-home services programs to low-income customers. The low-income sector is served through three programs:

- New Construction Program
- Single Family Program
- Multi–Family Program

A. NEW CONSTRUCTION PROGRAM

1. Background

There was no program specifically targeting low-income new construction prior to 1998 when the Companies began working with the Low-Income Energy Affordability Network (LEAN).

a) Market Barriers

Besides the barriers that exist to incorporating energy efficiency into any new construction, there are additional market barriers associated with the low-income new construction market:

- Lack of information about efficiency;
- Existing institutional and purchasing practices that do not lend themselves to life-cycle cost analyses;
- Transaction costs;
- Higher first costs;
- Misplaced or split incentives; and
- Product unavailability.
- An additional barrier to the construction of energy efficient low-income housing is that it is economically difficult to construct any low-income housing.

b) Market Intervention Strategies

The Companies/Agencies plan to work with the builders of low-income housing in order to address all of the barriers to energy efficient new construction listed above. Specific activities include: providing information and training in life-cycle costing; lowering the transaction costs through incentives and rebates; showing how efficient construction benefits both owners and tenants; attempting to identify mortgage sources for Low-Income New Construction; making energy efficient products available at lower prices through bulk purchasing and incentives; and providing a standardized program across the state in conjunction with the other utilities and with LEAN to minimize confusion and maximize benefits.

- ***Market Indicators***

The amount of new housing (whether single or multi-family) for low-income customers built to Energy Star standards will be the primary indicator of program success. Over time, changes in standard practice by builders of low-income housing toward more energy efficiency will be the primary indicator.

- ***Eligible Population, Market Penetration to Date, and Market Potential***

The following table presents Company-specific data for the Low-Income New Construction Program and estimates for 2000- 2002 estimated activity:

NStar Low-Income New Construction

Eligible Population	Penetration to date	Market Potential
TBD	N/A	TBD

NStar planned participation in Low-Income New Construction:

2000	2001	2002
TBD	TBD	TBD

2. Program Design

The Low-Income New Construction Program is designed to capture lost opportunities when a customer with at least 50 percent low-income tenants either does a major renovation or constructs a new building, or when single family homes for low-income families are built by such organizations as Habitat for Humanity. With the exception of a small number of units developed by such organizations, low-income new construction in the Companies' service territories is mostly multi-family. The Companies work closely with LEAN on all aspects of program design and implementation.

Additionally, the Companies are in touch with low-income housing advocates such as the Massachusetts Housing Finance Agency (MHFA), the Department of Housing and Community Development (DHCD), the Northeast Energy Efficiency Council (NEEC), Habitat for Humanity, and others who participate in Economic Development and program planning with the Companies. The Companies will attempt to leverage private and public funding sources in this effort.

a) Marketing Plans

In order to overcome the identified barriers and to promote the program, the Companies' staff will build on the relationships they have developed with Public Housing Authorities and the WAP Agencies, develop relationships with contractors who work in low-income housing construction, and perhaps with builders of manufactured housing. In addition, CSG (the contractor implementing the Energy Star Homes program) has a staff person working full time to develop housing projects for the low-income community that will be built to Energy Star standards.

b) Customer Incentives/Rebates

Incentives are provided at the same levels available in the regular Energy Star Homes program: plans review, post construction inspection and blower door test, and HERS certification to ENERGY STAR qualifying homes. In addition, ENERGY STAR appliances are featured with the offer of a rebate of $500.00 on the purchase of an ENERGY STAR electric appliance package of any three different qualifying products of refrigerators, dishwashers and room air conditioners, or fixed rebates on any one of these three appliances. Additional incentives, in the form of services, include an initial plans review for new construction, an HVAC commissioning and duct sealing service for furnaces, advice on lighting implementation and a HERS rating upon completion of a building. Additional incentives targeted to the low-income builder community may be developed in cooperation with LEAN and the other utilities. Incentives for other projects such as those of Housing and Urban Development or the Department of Housing and Community Development will be developed on a customized basis, balancing the objectives of (a) providing incentives that are cost-effective and no more than necessary and (b) sufficient to stimulate construction of the project.

c) Implementation Plan and Schedule

By statute, the low-income programs are implemented by the low-income weatherization and fuel assistance network. The Companies choose a lead vendor from the network (Action for Boston Community Development, "ABCD", for Boston Edison and South Middlesex Opportunity Council, "SMOC", for Commonwealth Electric and Cambridge Electric), which in turn sub-contracts on a geographic basis to other members of the network. The lead vendor serves as the project coordinator and the interface between the other agencies, subcontractors, other utilities, and the Companies. Network staff meet with the Joint Management Committee of the Energy Star Homes program as needed to refine program design and address specific issues.

Most of the program services, including tracking and reporting, are delivered directly by the network. However, in some cases it is more efficient or economical for the network to subcontract some program components on a competitive basis (*e.g.*, refrigerator purchase and delivery).

d) Program Administration

Overall administration is provided by the Companies' internal staff. Administration with respect to program operations is provided by the lead weatherization network vendor, and the program is coordinated by LEAN.

e) Other Program Components: None.

f) Consistency with DOER's Goals

A discussion of how the Companies' Low-Income programs meet both the Threshold Goal and the Priority-Setting Goals can be found at the end of this Section.

3. Program Evaluation and Market Research

The Companies are currently conducting a process evaluation of their Single Family, Multi-Family and New Construction programs. The evaluation will address barriers unique to each of the above three program markets. One of the goals of this evaluation is to use the results of this evaluation to inform the decisions being made pertaining to a statewide Low-Income program. An impact evaluation is currently planned for these programs, however, the Companies will work with LEAN to determine if these funds would be better suited to other evaluation efforts given the statewide effort being performed to revise the existing program. For example, LEAN has requested that the utilities in the state assess non-energy benefits such as arrearage reduction and the avoidance of termination/reconnection costs.

4. Performance Goals, Metrics and Incentives

The overall program goal of all the low-income programs is to provide comprehensive weatherization, energy conservation and education services to low-income customers in order to reduce their energy burden; make utility bills more affordable, houses safer and more comfortable, and reduce arrearages; and to provide these services in partnership with the local WAP agencies.

A specific objective for the next three years is to work on coordinating the Companies' low-income program with those of the other electric and gas utilities in Massachusetts through LEAN.

For the New Construction program specifically, long-term goals include the following:

- Change appliance procurement practices;
- Train housing authorities in life-cycle cost analysis;
- Improve standard practice for energy efficiency in public housing;
- Encourage mass procurement of energy efficient appliances by government authorities to stimulate the manufacturers, bring costs down and reduce incremental cost to the utility;
- Expand the number of builders and developers of low-income housing that incorporate energy efficiency into their housing; and
- Advocate for increased lending for the construction of low-income housing.

5. Proposed Budget

The budgets for the Low-Income New Construction for year 2000:

Boston Edison -- $____
Cambridge Electric -- $____
Commonwealth Electric -- $____
Please refer to Table YY in Section II of this EEP for the program budget for each Company, broken out by the sub-categories specified by the DOER.

6. Program Cost-Effectiveness

The cost-effectiveness test for this program includes an amount that reflects the Companies' best estimate of the specific benefits that accrue from the implementation of comprehensive energy

efficiency and education programs for low-income customers. The Low-Income program is consistent with the threshold goal regarding cost-effectiveness because the benefit/cost ratio is greater than 1.0. See Section II for details on program cost-effectiveness.

BCR ratio for each of the Companies :

- Boston Edison -- _____
- Cambridge Electric -- _____
- Commonwealth Electric -- _____

B. SINGLE FAMILY PROGRAM

1. Background

Low-income customers were served through the various programs listed above until 1998 when the Companies began coordinating their programs through LEAN.

a) Market Barriers

This market requires more assistance in obtaining energy efficiency services than does the general residential customer sector for several reasons. Specifically, many low-income households can be characterized by the following assumptions:

- Little cash and no available credit to fund high first cost of energy efficient products;
- Often in older, poorly insulated, energy-inefficient housing;
- Limited education and therefore ability to learn about energy efficient technologies or benefits;
- Skepticism as to the benefits of a government run program;
- Intense focus on needs for survival, leaving little time to focus on efficiency benefits;
- Difficult to reach;
- Likely to be renters not in control of large appliance purchases or whole-building measures;
- High energy burden compared to higher-income customers; and
- Often experience payment, arrearage and/or disconnect problems.

b) Market Intervention Strategies

The local weatherization network agencies are partners with the Companies. This relationship helps to overcome possible distrust of the utility and to take advantage of community-based resources. To overcome lack of education and information, the program includes an education component which provides personal, in-home instruction in good energy practices as well as budget counseling, if needed. High first costs of measures and the split incentive barrier are overcome by providing the measures at no cost to the recipients.

c) Market Indicators

The Low-Income Single Family Program is not a market transformation program (although elements of the program foster market transformation by contributing to the manufacture and sale of energy efficient products). Thus, typical market indicators are not appropriate to track. Success will be determined by the number of customers served and the amount of savings generated. The Companies are exploring ways to assess other indicators such as the reduction in energy burden faced by the target population (measured by reductions in arrearages and disconnections of service), persistence of measures installed and education received, and indicators of increased standard of living, reduced health problems, safety factors, and homelessness.

d) Eligible Population, Market Penetration to Date, and Market Potential

Originally the eligible population for low-income programs consisted of customers who were at 150 percent of the poverty level. A recent change has taken place and now customers at 200 percent of the poverty level may participate. Specifically, the low-income sector includes low-income customers (or buildings at least 50 percent populated by low-income customers) characterized by the percentage of their income required for energy (energy burden). This figure is more than double -- and often many times -- the average. Particular attention is paid to those with high usage, low income, and those with health and safety risks, including elderly and disabled low-income households. Lower priority is given to buildings where tenants do not pay utility bills directly. One means of identifying eligible households is their subscription to the R-2 and R-4 low-income rates, but fewer than half of low-income households subscribe to these rates (due to a lack of awareness of the rates' existence, low-income customer inaction, and/or pride or embarrassment).

In the past, weatherization services were available through the Companies' programs only for electric heat customers. For year 2000, the Companies will begin installing weatherization measures in homes heated with oil or other fuels. There will be a ramp-up period for this effort, beginning with 50, 52 and 26 homes respectively in the Boston Edison, Commonwealth Electric and Cambridge Electric service territories in 2000. In addition, for the AMP program, the usage threshold for eligibility has been 13 kWh per day; this level is being re-evaluated at lower thresholds.

The following table presents Company-specific data for the Low Income Single Family Program and tracking estimates for 2000- 2002 estimated activity:

Boston Edison Single Family

Eligible Population	**Penetration to date**	**Market Potential**
99,740	54.3%	45,581

Boston Edison planned participation Single Family:

2000	**2001**	**2002**
3,500	3,000	3,000

Commonwealth Electric Single Family

Eligible Population	Penetration to date	Market Potential
13,972	32%	9,500

Commonwealth Electric planned participation Single Family:

2000	2001	2002
600	510	520

Cambridge Electric Single Family

Eligible Population	Penetration to date	Market Potential
1,295	38%	803

Cambridge Electric planned participation Single Family:

2000	2001	2002
100	80	80

2. Program Design

The focus of the Low-Income Single Family Program is delivering energy efficiency products and services directly into the homes of eligible low-income customers, in order to help lower customer energy bills while contributing to other key energy efficiency market transformation objectives. Most products and services available are common to all low-income programs. The Low-Income Single Family Program is comprised of two components: the Appliance Management Program (AMP) and the Space Heat Program.

The AMP program offers site visit diagnostics, customer education, disaggregation of the customer's electric bill, analysis of high-use appliances, installation of conservation materials, and refrigerator and freezer analysis to determine need for replacement. Disposal is performed in an environmentally responsible manner, including recycling of all CFCs. The appliance package includes up to five CFLs, hot water flow restrictors, pipe insulation and tank wraps as applicable, along with the replacement of existing refrigerators and freezers with high efficiency models. In addition, waterbeds will be replaced with "flat" beds and a small number of ENERGY STAR air conditioners may be provided.

Energy Managers conduct a fuel-blind audit, identifying causes of high electricity use. Energy Managers develop solutions to high-use problems cooperatively with customers, including budget and credit counseling if requested by the customer. Managers install efficiency measures and prepare work orders for other services (*e.g.*, replacement refrigerators, weatherization), piggybacking with other programs (especially those of DOE, DHCD, and gas utilities) where possible, and educate customers about the measures. Fuel-blind installations are performed to DOE WAP specifications, criteria, and priorities. Installations are followed up to ensure proper delivery and reinforce educational messages.

The Space Heating component provides home weatherization services on a prescriptive basis. Installed measures may include wall and ceiling insulation, blower door assisted air sealing, interior storm windows, set back thermostats, and hot water tank and pipe wraps.

The program also includes increasing awareness among low-income customers of the importance of energy efficiency and encouraging customers to act on the basis of this awareness.

a) Marketing Plans

A vital element of the marketing plan is an outreach effort to notify customers of the availability and value of low-income rates and energy efficiency services. Current marketing efforts consist of contacting, by mail and/or telephone, customers subscribing to the low-income rates (R-2 and R-4) who are identified as having not received prior efficiency services. The Companies provide these data to their vendors. Direct mail, bill inserts, and literature distributed through social service agencies, government offices, and other networks are also used.

The WAP agencies will do outreach in their communities and will screen and refer customers to the Companies' program who apply for LIHEAP, weatherization, or other services from the agencies. The program will fund other recruitment and outreach strategies as they are developed.

b) Customer Incentives/Rebates

All low-income products and services are delivered with no co-payment from the customers and, in the case of in-home single-family participants, by means of direct installation. Specifically trained staff from local WAP agencies provide in-home counseling to customers on their electric bills if requested, meter high use appliances, and install energy efficient measures. Customers save about 10 percent on their electric bill, an important component of increasing energy affordability in their home.

c) Implementation Plan and Schedule

By statute, the low-income programs are implemented by the low-income weatherization and fuel assistance network. The Companies work closely with the network on all aspects of program design and implementation. The Companies choose a lead vendor from the network (Action for Boston Community Development, "ABCD", for Boston Edison and South Middlesex Opportunity Council, "SMOC", for Commonwealth Electric and Cambridge Electric), which in turn sub-contracts on a geographic basis to other members of the network. The lead vendor serves as the project coordinator and the interface between the other agencies, subcontractors, other utilities, and the Companies. Most of the program services, including tracking and reporting, are delivered directly by the network. However, in some cases it is more efficient or economical for the network to subcontract some program components on a competitive basis (*e.g.*, refrigerator purchase and delivery).

d) Program Administration

Overall administration will be provided by the Companies' internal staff. Administration with respect to program operations will be provided by the lead weatherization network vendor.

e) Other Program Design Components

The target market for weatherization services is similar to the DOE weatherization program. The purpose is to extend the benefits of that program to more customers and enable the weatherization network to efficiently deliver a total package of energy efficiency services including weatherization for heating usage and appliance services.

f) Consistency with DOER's Priority Setting Goals

A discussion of how the Companies' Low-Income programs meet both the Threshold Goal and the Priority-Setting Goals can be found at the end of this Section.

3. Program Evaluation and Market Research

The Companies are currently conducting a process evaluation of their Single Family, Multi-Family and New Construction programs. The evaluation will address barriers unique to each of the above three program markets. One of the goals of this evaluation is to use the results of this evaluation to inform the decisions being made pertaining to a statewide Low-Income program. An impact evaluation is currently planned for these programs, however, the Companies will work with LEAN to determine if these funds would be better suited to other evaluation efforts given the statewide effort being performed to revise the existing program. For example, LEAN has requested that the utilities in the state assess non-energy benefits such as arrearage reduction and the avoidance of termination/reconnection costs.

4. Performance Goals, Metrics and Incentives

The overall program goal of all the low-income programs is to provide comprehensive weatherization, energy conservation and education services to low-income customers in order to reduce their energy burden; make utility bills more affordable, houses safer and more comfortable, and reduce arrearages; improve low-income customers' standard of living; and to provide these services in partnership with the local WAP agencies.

A specific objective for the next three years is to work on coordinating the Companies' low-income program with those of the other electric and gas utilities in Massachusetts through LEAN.

For metrics specific to the Low-Income Single Family Program, see Table XXX in Section II of this plan.

5. Proposed Budget

The budgets for the Low-Income Single Family program for year 2000:

Boston Edison -- $____
Cambridge Electric -- $____
Commonwealth Electric -- $____
Please refer to Table YY in Section II of this EEP for the program budget for each Company, broken out by the sub-categories specified by the DOER.

6. Program Cost-Effectiveness

The cost-effectiveness test for this program includes an amount that reflects the Companies' best estimate of the specific benefits that accrue from the implementation of comprehensive energy efficiency and education programs for low-income customers. The Low-Income Single Family program is consistent with the threshold goal regarding cost-effectiveness because the benefit/cost ratio is greater than 1.0. See Section II for details on program cost-effectiveness.

BCR ratio for each of the Companies :

- Boston Edison -- _____
- Cambridge Electric -- _____
- Commonwealth Electric -- _____

C. MULTI-FAMILY SERVICES

1. Background

Low-income customers were served through the various programs listed above until 1998 when the Companies began coordinating their programs through LEAN.

a) Market Barriers

The multi-family low-income market experiences the same barriers as found in the single family low-income market. Specifically, many low-income households can be characterized by the following assumptions:

- Little cash and no available credit to fund high first cost of energy efficient products;
- Often in older, poorly insulated, energy-inefficient housing;
- Limited education and therefore ability to learn about energy efficient technologies or benefits;
- Skepticism as to the benefits of a government run program;
- Intense focus on needs for survival, leaving little time to focus on efficiency benefits;
- Difficult to reach;
- Likely to be renters not in control of large appliance purchases or whole-building measures;
- High energy burden compared to higher-income customers; and

- Often experience payment, arrearage and/or disconnect problems.

Additional barriers to reaching low-income customers who reside in multi-family buildings, often managed by a public housing authority, include the following:

- Split incentives between landlords and tenants; and
- Difficulty working with public housing authorities due to scheduling, financing, and bureaucratic impediments.

b) Market Intervention Strategies

In order to overcome the identified barriers and to promote the program, the Companies' staff will build on existing relationships with Public Housing Authorities, the WAP agencies, and other low-income housing owners. The local weatherization network agencies are partners with the Companies. This relationship helps to overcome possible distrust of the utility and to take advantage of community-based resources. For the tenants living in multi-family housing, the program includes an education component that provides personal, in-home instruction in good energy practices as well as budget counseling, if needed. High first costs of measures and the split incentive barriers are overcome by providing the measures at no cost to the recipients.

c) Market Indicators

The Low-Income Multi-Family Program is not a market transformation program (although elements of the program foster market transformation by contributing to the manufacture and sale of energy efficient products). Thus, typical market indicators are not appropriate to track. Success will be determined by the number of customers served and the amount of savings generated, as well as the number of multi-family facilities participating. The Companies are exploring ways to assess other indicators such as the reduction in energy burden faced by the target population (measured by reductions in arrearages and disconnections of service), persistence of measures installed and education received, and indicators of reduced health problems, increased standard of living, safety factors, and homelessness.

d) Eligible Population, Market Penetration to Date, and Market Potential

Originally the eligible population for low-income programs consisted of customers who were at 150 percent of the poverty level. A recent change has taken place and now customers at 200 percent of the poverty level may participate.

Specifically, The low-income multi-family sector includes low-income customers in buildings at least 50 percent populated by low-income customers. Lower priority is given to buildings where tenants do not pay utility bills directly.

The following table presents Company-specific data for the Low Income Multi-Family Program and tracking estimates for 2000- 2002 estimated activity:

Boston Edison Multi-Family

Eligible Population	Penetration to date	Market Potential
99,740	7.6%	92,160

Boston Edison planned participation Multi-Family:

2000	2001	2002
500	430	430

Commonwealth Electric Multi-Family

Eligible Population	Penetration to date	Market Potential
13,972	8%	12,841

Commonwealth Electric planned participation Multi-Family:

2000	2001	2002
850	720	720

Cambridge Electric Multi-Family

Eligible Population	Penetration to date	Market Potential
1,295	14%	1,110

Cambridge Electric planned participation Multi Family:

2000	2001	2002
150	120	120

2. Program Design

The focus of the Low-Income Multi-Family Program is delivering energy efficiency products and services directly into the homes of existing, eligible low-income customers who live in multi-unit housing. The Low-Income Multi Family Program is comprised of two components: the Appliance Management Program (AMP) and the Space Heat Program.

AMP provides appliance-related services to the multi-family low-income population. The program offers site visit diagnostics, customer education, disaggregation of the customer's electric bill, analysis of high-use appliances, installation of conservation materials, and refrigerator and freezer analysis to determine need for replacement. Refrigerators and freezers in need of replacement will be replaced at no additional cost to the low-income customer or to the landlord. Disposal is performed in an environmentally responsible manner, including recycling of all CFCs. The appliance package includes up to five CFLs, hot water flow restrictors, pipe insulation and tank wraps as applicable, along with the replacement of existing refrigerators and freezers with high efficiency models. In addition, waterbeds will be replaced with "flat" beds and a small number of ENERGY STAR air conditioners may be provided.

Energy Managers conduct a fuel-blind audit, identifying causes of high electricity use. Energy

Managers develop solutions to high-use problems cooperatively with customers, including budget and credit counseling where appropriate. Managers install efficiency measures and prepare work orders for other services (*e.g.*, replacement refrigerators, weatherization), piggybacking with other programs (especially those of DOE, DHCD, and gas utilities) where possible, and educate customers about the measures. Fuel-blind installations are performed to DOE WAP specifications, criteria, and priorities. Installations are followed up to ensure proper delivery and reinforce educational messages.

The Space Heating component provides home weatherization services on a prescriptive basis. Installed measures may include wall and ceiling insulation, blower door-assisted air sealing, interior storm windows, set-back thermostats, and hot water tank and pipe wraps.

In addition to measures in individual units, which are the same for all low-income programs, this program provides hard-wired energy efficient lighting retrofits for common areas, including outdoor lighting. The program also provides rebates on common-area clothes washers to enable the purchase of high-efficiency washers. Building owners will be provided educational materials about reducing operating costs through energy management and maintenance practices.

The program also includes increasing awareness among low-income customers of the importance of energy efficiency and encouraging customers to act on the basis of this awareness.

a) Marketing Plans

A vital element of the marketing plan is an outreach effort to notify customers of the availability and value of low-income rates and energy efficiency services. Current marketing efforts consist of contacting, by mail and/or telephone, customers subscribing to the low-income rates (R-2 and R-4) who are identified as having not received prior efficiency services. The Companies provide these data to their vendors. Direct mail, bill inserts, and literature distributed through social service agencies, government offices, and other networks are also used.

The WAP agencies will do outreach in their communities and will screen and refer customers to the Company's program who apply for LIHEAP, weatherization, or other services from the agencies. The program will fund other recruitment and outreach strategies as they are developed.

In addition, the Companies will use their relationships with public housing authorities and other low-income property managers to directly market the benefits of this program to them and their tenants.

b) Customer Incentives/Rebates

All low-income products and services are delivered with no co-payment from the customer and by means of direct installation. Specifically trained staff from local Network agencies provide in-home counseling to customers on their electric bills if requested, meter high use appliances, and install energy efficient measures.

c) *Implementation Plan and Schedule*

By statute, the low-income programs are implemented by the low-income weatherization and fuel assistance network. The Companies choose a lead vendor from the network (Action for Boston Community Development, "ABCD", for Boston Edison and South Middlesex Opportunity Council, "SMOC", for Commonwealth Electric and Cambridge Electric), which in turn sub-contracts on a geographic basis to other members of the network. The lead vendor serves as the project coordinator and the interface between the other agencies, subcontractors, other utilities, and the Companies. Most of the program services, including tracking and reporting, are delivered directly by the network. However, in some cases it is more efficient or economical for the network to subcontract some program components on a competitive basis (*e.g.*, refrigerator purchase and delivery).

d) *Program Administration*

Overall administration will be provided by the Companies' internal staff. Administration with respect to program operations will be provided by the lead weatherization network vendor.

e) *Other Program Design Components*

The target market for weatherization services is similar to the DOE weatherization program. The purpose is to extend the benefits of that program to more customers and enable the weatherization network to efficiently deliver a total package of energy efficiency services including weatherization for heating usage and appliance services.

Buildings in which 50 percent or more of the residents are low income require no customer co-payment and are eligible for special services. The Network will take a lead role in overseeing services to these customers. Special services include the negotiation of tenant protections in landlord agreements where appropriate and requested, coordination with community-based (community development funding) or regional/national (HUD, DHCD) support services, and identification of customers eligible for low-income rates or other social services. The Companies will fund the Network to provide these services.

All potential energy saving measures will be evaluated on a building-specific basis. Typical measures are evaluated and installed if cost-effective, as well as custom measures which may only be applicable to a particular building. Typical measures include new efficient lighting equipment, refrigerators, and measures included in the AMP program. In electrically heated buildings, typical measures would also include insulation, air sealing, and thermostats.

f) *Consistency with DOER's Priority Setting Goals*

A discussion of how the Companies' Low-Income programs meet both the Threshold Goal and the Priority-Setting Goals can be found at the end of this Section.

3. Program Evaluation and Market Research

The Companies are currently conducting a process evaluation of their Single Family, Multi-Family and New Construction programs. The evaluation will address barriers unique to each of the above three program markets. One of the goals of this evaluation is to use the results of this evaluation to inform the decisions being made pertaining to a statewide Low-Income program. An impact evaluation is currently planned for these programs, however, the Companies will work with LEAN to determine if these funds would be better suited to other evaluation efforts given the statewide effort being performed to revise the existing program. For example, LEAN has requested that the utilities in the state assess non-energy benefits such as arrearage reduction and the avoidance of termination/reconnection costs.

4. Performance Goals, Metrics and Incentives

The overall program goal of all the low-income programs is to provide comprehensive weatherization, energy conservation and education services to low-income customers in order to reduce their energy burden; make utility bills more affordable, houses safer and more comfortable, and reduce arrearages; improve low-income customers' standard of living; and to provide these services in partnership with the local WAP agencies.

A specific objective for the next three years is to work on coordinating the Companies' low-income program with those of the other electric and gas utilities in Massachusetts through LEAN.

For metrics specific to the Low-Income Multi-Family Program, see Table XXX in Section II of this plan.

5. Proposed Budget

The budgets for the Low-Income Multi-Family program for year 2000:

- Boston Edison -- $____
- Cambridge Electric -- $____
- Commonwealth Electric -- $____

Please refer to Table YY in Section II of this EEP for the program budget for each Company, broken out by the sub-categories specified by the DOER.

6. Program Cost-Effectiveness

The cost-effectiveness test for this program includes an amount that reflects the Companies' best estimate of the specific benefits that accrue from the implementation of comprehensive energy efficiency and education programs for low-income customers. The Low-Income Multi-Family program is consistent with the threshold goal regarding cost-effectiveness because the benefit/cost ratio is greater than 1.0. See Section II for details on program cost-effectiveness.

BCR ratio for each of the Companies :

- Boston Edison -- _____
- Cambridge Electric -- _____
- Commonwealth Electric -- _____

CONSISTENCY OF THE LOW-INCOME PROGRAMS WITH DOER'S GOALS

Consistency with DOER's Threshold Goal

The threshold goal: *"to provide funding for energy efficiency services for low-income ratepayers at the levels directed by the [Restructuring] Act"* will be met by the Companies' Low-Income Programs. The contribution from all ratepayers (at a rate of 0.25 mill per kWh to be used for funding energy efficiency services to low-income people) will be spent on the Companies' low-income customers.

Consistency with DOER's Priority Setting Goals

This program also meets several of the priority goals set by DOER.

- Goal – *Allocate funds equitably*: The Low-Income programs ensure that energy efficiency funds are allocated equitably among customer classes by allocating to low-income customers that amount set by the Legislature for that customer class.

- Goal – *Support capturing lost opportunities*: These programs capture lost opportunities, since low-income customers would not be able to install energy efficiency measures on their own, and all of these opportunities would otherwise be lost. In general, low-income consumers tend to purchase the lowest-cost (and most often the least efficient) products available on the market. In addition, the Low-Income New Construction program is a lost opportunity program in the traditional sense.

- Goal – *Give due emphasis to statewide or regional market transformation*: Because these programs are coordinated with all Massachusetts electric and gas utilities as well as the WAP agencies, they meet the goal of emphasizing statewide initiatives. Wholesale purchases of energy efficient appliances and products such as refrigerators and lighting fixtures and bulbs, and insulating and sealing materials, further the transformation of markets for these products by increasing production and lowering costs in the marketplace.

- Goal – *Use competitive procurement processes and foster development of competitive markets for energy efficient products*: Products installed through these programs are obtained through competitive procurement, thereby meeting the goal of utilizing competitive processes to the extent practicable and fostering markets for energy-efficient products.

- Goal – *Balance short- and long-term reductions in customers' energy costs*: These programs

reduce considerably the customers' energy costs – both in the short- and long-term. The customers see immediate and long-term savings on their electric (and often gas or oil) bills. Through bulk purchases of energy efficient appliances and other products, the programs stimulate reduction in the costs of these products in the long term.

- Goal – *Optimize cost-effectiveness*: The Low-Income programs optimize cost-effectiveness, because energy efficiency and education services to low-income customers provide value not only directly to these customers, but also to all other ratepayers as well as society as a whole. There should be demonstrated reductions in arrearages, disconnections and reconnect costs, uncollectibles and collection costs, and utility administration costs. In addition, these programs will improve the lives of the low-income families who participate, increasing safety, health, and comfort. Medical and fire costs will be lowered, as will homelessness and its costs.

Attachment 3

Connecticut utility low-income efficiency program designs

(Connecticut Light & Power Co.)

CL&P's Special Needs Programs: Residential

Low Income

The residential low-income weatherization efforts are being expanded to include an added focus on reducing barriers to participation (Energy Care Initiative) and avoiding lost opportunities in the new construction market (Low Income New Construction Initiative, which is described in the section on Residential New Construction). The nationally recognized WRAP program will continue and leverage its efforts with these other, new low-income initiatives.

ENERGY CARE INITIATIVE

Strategic Initiative:
Special Needs – Expansion of Intake to begin in 2000

Target Market:
Customers whose income is below 200 percent of the federal poverty level, and for whom the energy burden (percent of total annual income spent on energy) is high. (A study published in January 1995 by the National Consumer Law Center shows that in Connecticut, in 1992, the average energy burden for persons with a median income was just under 4 percent; for customers earning the minimum wage, the burden was nearly 17 percent; for those on SSI, it was 16 percent.)

Target low-income customers for whom other factors interfere with their being able to take advantage of conservation services. For example: limited literacy or competency; limited education; age; physical or mental disabilities; people returning to the community from group homes, prisons, and shelters. Also group living settings, such as residential treatment facilities, group homes, half-way houses, and shelters. Agencies that have responsibility for people with competency issues, such as the following: hospital and treatment center outpatient, discharge planning and social service departments; local social service agencies; Department of Social Services (DSS); Department of Public Health; Department of Mental Health and Addiction Services; Department of Children and Families; Department of Mental Retardation; Community Partners in Action; the Corrections Department; nursing homes; senior centers; and nutrition sites.

In addition to the market barriers associated with all low-income customers (lack of funds for conservation, lack of information, split incentives, other more important issues like food and health care), these customers may have mental or physical impediments that affect the customers' ability to follow through on appointments or budget planning, or lack the requisite skills to take advantage of opportunities available. Fear of strangers or apprehension about letting contractors into the home may also play a role.

Services Offered:
This is an intake service that will provide low-income customers with information about and access to various programs through a simple-to-use screening tool and referral service. Intake will be conducted by several entities including CL&P's Community Relations staff, the Special Assistance group within CL&P's Credit Department, Community Action Agencies, Infoline, and a human

services agency. *(If details are negotiated and differences in eligibility and/or services available are embedded in the screening tool, UI could participate in this intake initiative and then provide approved services to eligible customers in its service territory.)*

The programs available to customers through this initiative include:

- WRAP, NU Start, and Energy Conservation and Budgeting Workshops.
- Credit counseling and energy use education.
- If they ask, customers will also be provided with information on the restructured electric market, including their options with respect to aggregation, energy brokers, and choices available to them.
- Training will be provided to managers of group living settings through workshops, education and information, in order to prepare their clients to make wise energy decisions upon moving into their own homes, as well as to use energy efficiently in the group settings.
- CL&P will provide increased levels of training to CAA staff through workshops and educational materials, as well as providing the screening tool to facilitate the intake process. The CAAs will provide energy education at the time of audit or needs assessment within the WRAP program.
- CL&P will provide the screening tool to Infoline to supplement the information Infoline provides on the Company's programs. (Infoline currently takes over 12,000 calls from clients regarding utility services, including energy assistance, disconnects and arrearages. Infoline provides information, refers the callers to the appropriate utility, provides some counseling, and does some follow-up to ensure that the callers received appropriate services.)
- CL&P will also provide any needed training to Infoline staff on use of the screening tool as well as on program offerings and services available to customers.

For year 2000, the plan is to initiate a pilot that will target one human service agency for more intensive outreach, while still making services available through all the other entities mentioned above. In addition, as part of the pilot, Infoline will provide additional outreach and case management services to elderly identified for WRAP services.

Marketing Plan:
Program objective: Increase participation by low-income customers in the Company's WRAP program and in other programs designed to lower the energy burden faced by this population. Expand the role of the CAAs to increase outreach and provide additional direct services to low-income customers. Involve a human service agency in the referral and follow-up process.

The goal for year 2000 is to increase participation in the WRAP program from 4000 to 6000 customers (including weatherization of 1000 fossil-fuel-heated homes).

Communications strategy:

- Take advantage of the broad awareness among Connecticut citizens of the availability and expertise of Infoline; build on a well-established, highly respected organization. Build on Infoline's visibility and marketing of the 211 emergency help telephone number.
- Expand outreach to CAAs, social service agencies, mental and public health agencies and other human service providers to disseminate the information necessary to reach the target market.
- Fund a toll-free telephone line at CL&P Special Assistance Unit which is staffed by knowledgeable people;
- Expand the Special Assistance Unit within CL&P's Credit Department to answer the telephone line, and provide coordination and follow-up services;
- Develop an Internet site that can provide information on all payment assistance, energy conservation and education services available to the target population;
- Community Relations staff will up-date the web site and develop supporting materials;
- Use radio ads and bus posters to reinforce the message;
- Simplify the message delivered to all entities and to the target low-income population to maximize understanding, and therefore participation.

Key messages: For low-income customers struggling to make ends meet, the message will be that there is help available at no cost to them that can lower the energy burden they face, make utility bills more affordable, and increase comfort and safety in their homes. This help is easy to access, and people in their communities are going to provide it. In addition, the message that saving energy helps protect the environment will be included in the communications strategy.

For the human service agency, the message will emphasize the benefits of referring clients to CL&P's low-income programs: Lowered energy burden; more money available for life's other necessities; better control over at least one aspect of their lives; and safer, more comfortable housing.

Tactics by target audience: Whether a referral comes through Infoline, a CAA, or another human service agency, the Company will emphasize the fact that customers (and human service agency personnel) will only have to deal directly with a specialized team within the Company: the Special Assistance and Community Relations staff who will assist them. That team will ensure that all appropriate services – from payment plans, arrearage forgiveness, education, and credit counseling through energy conservation – will be delivered with minimum of hassle to the customer.

How Delivered:
The enclosed flow chart [unavailable] entitled "Pilot Low Income Program Service Delivery Process" shows how and by whom services would be delivered. It also shows how shows how referrals will come into the tracking system, and how follow-up and evaluation will take place.

Human Service Agencies

CL&P will provide the screening tool and training to participating organizations and agencies. Because the offered services will supplement what is currently provided, those traditionally provided by the human service agencies will be funded by CL&P, no funds will flow from CL&P to these agencies.

Infoline

An agreement between CL&P and Infoline will be finalized that recognizes Infoline's expertise in utility services, outreach intake capabilities, in order to provide expanded energy-related services to the target population, and to maximize benefits for participants in those services. The agreement will encompass the following provisions:

- Infoline staff will expand the information they provide to callers regarding the Company's programs, based on the screening tool;
- Infoline will identify callers as potential recipients of all energy-related services, including WRAP, NU Start, budget billing, energy assistance, winter protection, other DSM services, and gas arrearage forgiveness;
- Infoline will determine the level of assistance needed by a caller to access the identified appropriate services and will proceed accordingly:
    1. If a customer is illiterate, Infoline staff would prepare program applications for the caller's signature;
    2. Infoline staff will call CL&P Special Assistance or Customer Relations group to arrange necessary energy services;
    3. Infoline will call a CAA for energy assistance help or refer the caller to the local CAA;
    4. Infoline will refer the caller to another human service agency; and
    5. Infoline will provide more extensive follow-up.

- CL&P and Infoline will develop a computer tool for Infoline that is compatible with CL&P's computer system to track clients and enable follow-up and evaluation;
- Infoline will follow up with callers to ensure delivery of services and provide additional support when necessary; and
- Infoline will enter caller information in a database that includes such information as eligibility level, services and/or agencies referred to; services delivered or reasons for non-delivery.

For the 2000 pilot program, Infoline will provide an enhanced level of services to some customers. Infoline will refer these families to all appropriate and necessary energy-related services, and will provide close follow-up to ensure that they receive what they need.

Community Action Agencies (CAAs)

An agreement between CL&P and each of the CAAs will be finalized that spells out the expanded intake role of the CAAs going forward, as follows:

- CL&P will provide the screening tool and training in its use to the CAAs;
- Working with the CAAs, CL&P will develop educational materials to be provided to customers at the time of audits and installations by CAAs or subcontractors. Education will focus on the end uses that require the highest electricity use in each home, including lighting, cooking, heating, cooling, and appliances. Customers will be informed about the best ways to manage these uses more efficiently;
- CAAs will expand their outreach activities in order to increase participation by customers not traditionally served;
- CAAs will refer customers, if eligible, to CL&P for appropriate payment assistance, NU Start, winter protection, or non-WRAP DSM services if not eligible for WRAP; to WRAP for weatherization and comprehensive energy efficiency services if eligible; and/or to the appropriate human service agency for non-energy-related services;
- CAAs will provide energy assistance if a customer is eligible;
- CAAs will deliver Expanded WRAP services (described under WRAP program, below) once they receive work orders from the WRAP Unit;
- CAAs will enter customer information in a database, including services and agencies referred to;
- CAAs will follow up all referred customers with telephone calls or home visits, if necessary, to ensure appropriate service delivery.

CL&P

Community Relations staff will be the central, coordinating point for this expanded intake initiative. They will work with the Special Assistance Unit, human service agencies, Infoline, and the CAAs to monitor delivery of energy-related services to this vulnerable population of customers. Specifically:

- Working with Infoline and the CAAs, Community Relations staff will develop a simple-to-use screening tool for affected agencies to use to access services, and will provide training and supporting materials for its use.
- Community Relations staff will provide follow-up directly or through the WRAP Unit to ensure that applicable conservation and education services are delivered;
- Community Relations staff will closely coordinate with Special Assistance staff in order to help customers work out a budget or arrearage forgiveness plan, or develop other innovative strategies to help people pay their electric bills, if necessary, while conservation and education services are provided to lower those bills;
- Community Relations staff will conduct workshops and meetings, provide training sessions and materials, conduct surveys, review, evaluate, assess, and refine strategies, to ensure that the initiative is being successfully implemented;
- Community Relations staff will keep the Internet site up-to-date;
- Special Assistance staff will provide knowledgeable coverage for the toll-free telephone line.

Budget: $5,130,000 for Energy Care and WRAP combined (see below)

Measuring Success: Program participation will be tracked by Infoline, the CAAs, WRAP, and CL&P Customer Relations. A process evaluation will be conducted beginning six to twelve months into 2000, so that any major problems can be identified and corrected early on in program delivery, with continuing process evaluations at the end of years one and three.

WRAP (WEATHERIZATION RESIDENTIAL ASSISTANCE PARTNERSHIP)

Strategic Initiative:
A Special Needs program begun in 1990, expanding in 2000

Target Market:
The target population for the WRAP program consists of customers with an annual income below 200 percent of the federal poverty level, in single or multifamily homes, regardless of fuel used for heat. In Connecticut, approximately 100,000 to 150,000 households fall into this category. (The number changes with changes in the economy.) Of these, approximately 36,000 have been identified as "hardship" customers who receive protection from disconnections during the winter months. These customers have a high energy burden (often more than double or triple) compared to other customers.

For year 2000, eligibility criteria will be simplified, and all customers who meet the income requirements will be eligible for some services. An assessment of which measures are cost-effective for a particular house will be made at the time of audit. NU Start program participants are offered WRAP services at the time of their enrollment in NU Start in order to lower their energy burden and reduce the chances of their becoming delinquent again. Eligible customers will receive credit counseling and energy use education, as appropriate.

This market requires more assistance in obtaining energy efficiency services than does the general residential customer sector for several reasons. Specifically, many low-income households can be characterized by the following assumptions:

- Little cash and no available credit to fund high first cost of energy efficient products;
- Often residing in older, poorly insulated, energy-inefficient housing;
- Limited time or education and therefore ability to learn about energy efficient technologies or benefits;
- Intense focus on needs for survival, leaving little time to focus on efficiency benefits;
- Difficult to reach;
- Likely to be renters not in control of large appliance purchases or whole-building measures;
- High energy burden compared to higher-income customers;
- Often experience payment, arrearage and/or disconnect problems.

Services Offered:
WRAP offers a full range of energy conservation measures to address inefficient lighting, general waste heat, water heating, inefficient heating equipment, refrigeration, and insufficient insulation. Measures include (where cost-effective) CFLs, lighting fixtures, water heater wraps or replacement, heat pump water heaters, low-flow showerheads, low-flow faucet aerators, waterbed insulated covers, door sweeps, thermostats, weatherization and insulation, energy efficient refrigerators and freezers, broken window replacement, and burner and furnace replacement.

Refrigerators are the single biggest power consumers in most households. A typical refrigerator made around 1990 uses over 900 kilowatt hours per year, which is approximately the same amount of energy that would be used by leaving a 1,250 watt hairdryer on for a month. Energy Star refrigerators, however, incorporate several advanced features including better insulation, more efficient compressors, improved heat transfer surfaces and more precise temperature mechanisms. The Company will install Energy Star refrigerators in at least one-quarter of the homes served through WRAP.

Comprehensive energy use education will be provided to every household visited, and budget management and counseling will be provided when needed and requested. CL&P also sends a newsletter ("Help Line") with energy education, conservation tips, safety information, and other useful resource listings to participants and other low-income customers. Finally, CL&P provides training for the network of CAAs that deliver the direct services.

In 2000, CL&P may explore a pilot program to install solar hot water heaters – perhaps coordinated with the Renewable Energy Fund, in low-income households. Such a program has been proposed in Pennsylvania. Another possible addition to the program is the installation of solar water heating or rooftop photovoltaics (PV) in conjunction with the DOE's "Million Solar Roof" initiative.

Marketing Plan:
Program objective: To provide comprehensive weatherization, energy conservation and education services to low-income customers in order to reduce their energy burden; make utility bills more affordable, houses safer and more comfortable, and reduce arrearages; and to provide these services in partnership with the local CAAs.

Specific objectives for year 2000 include the following:

- Increase the number of low-income homes served through WRAP from 4000 to 6000;
- Included in the 6000, provide 1000 fossil-fuel heated homes with weatherization as well as all appropriate electric energy-saving measures;
- Provide one-quarter of the households with new, energy-efficient refrigerators;
- With every audit, provide energy use education and information on opportunities for saving energy through changing appliance usage and practices;
- Provide credit and budget counseling when appropriate; follow up with telephone calls and visits to ensure persistence of savings and reinforce education.

Communications strategy: Overall, the strategy is to use as many avenues as are practical and efficient to market the WRAP program. The primary new marketing tool for 2000 will be the Energy Care initiative described above which will entail a simple screening tool to be used by the CAAs, Infoline, and the human service agency network that works with the low-income population in Connecticut.

Key messages: The message for the WRAP program is the same as that for the Energy Care initiative: that there is free help available to lower the energy burden faced by low-income customers, to make utility bills more affordable, and to increase comfort and safety in their homes; this help is easy to access; and it will be provided by local people from their communities.

Tactics by target audience: In addition to the Energy Care activities described above, specific marketing tactics for low-income customers will include the following:

- CL&P will send letters in coordination with DSS twice a year informing customers of their opportunity to participate;
- CL&P will publicize the WRAP program in the newsletter "Help Line" it sends to low-income, elderly and disabled customers;
- CL&P will re-institute its popular "Good Neighbor Energy Calendar" that provides energy tips and publicizes the WRAP program;
- CL&P will provide bill inserts advertising availability of the WRAP program to eligible customers;
- Customers who apply for payment assistance, NU Start, or credit help will be screened and, where appropriate, referred by the Special Assistance department to WRAP;
- Customers who call the Company's toll-free telephone line or regular business line for assistance will be screened and referred to WRAP, if appropriate;
- Callers (or human service agencies assisting customers) can access the screening tool over the Internet at CL&P's web site.
- CAAs will do outreach within their communities and will screen and refer clients to WRAP who request other services the CAAs provide;
- CAAs will screen and refer appropriate clients who apply for fuel assistance;
- CAAs will conduct energy use and conservation workshops for the local population and refer interested attendees to WRAP.

Marketing budget: $253,000 for WRAP and Energy care combined.

How Delivered:

The WRAP program coordinates CL&P-funded services with those funded by the state and by the Department of Energy (DOE). Some services are funded by Connecticut Natural Gas and Yankee Gas; these services are also coordinated with this program. Such coordination enables CL&P to leverage its outreach to the low-income community and to serve more families. The flow chart presented in the description of the Energy Care initiative delineates the delivery of services in the WRAP program, since Energy Care is one of the primary intake points for WRAP.

WRAP

The WRAP Unit (administrators of the program) also administers all of the residential energy audits provided by Connecticut Natural Gas, Southern Connecticut Gas, United Illuminating, Yankee Gas, and the major oil distributors, which spreads the administrative costs over a large number of entities.

An application is received by the WRAP Unit through any of the channels described above or through the Energy Care initiative. The WRAP unit forwards a work order to the appropriate CAA, according to where the customer lives.

The WRAP unit provides training and workshops to the CAAs and auditors, to provide consistency, quality, cost-effectiveness, and standardization in that training.

The WRAP unit does bulk purchasing of refrigerators and other materials such as lightbulbs, showerheads, aerators, waterbed covers, and water heater wraps, in order to obtain discount pricing and assure quality.

The WRAP unit provides administrative simplicity and uniformity to delivery of services to low-income customers across service territories. Problem-solving is simplified and benefits from being able to extrapolate to one area from experience in another.

The WRAP Unit sends questionnaires to participants as a measure of quality control and to ensure consistency of service delivery among CAAs. Responses that raise questions as to service delivery will result in follow-up by the WRAP Unit to determine the cause of any problems and to find solutions in coordination with the relevant CAA.

CAAs

A CAA receives a work order from the WRAP unit and arranges for the following listed services to be delivered by contractors who have won the right to provide them through competitive bidding, or by the CAAs themselves, as appropriate:

- Conduct a fuel-blind energy audit of the household;
- Identify causes of high electricity use related to lighting and appliances;
- Identify solutions to high-use problems by working cooperatively with customers in their homes;
- Install all cost-effective energy saving measures including those listed above;
- Educate the customers on use and care of the measures to ensure continued savings;
- Provide budget and credit counseling when appropriate and requested;
- "Piggy-back" service delivery whenever possible to services being delivered through public or other utility funding, in order to reduce administrative costs as well as inconvenience to the customer through multiple home visits;

- Conduct periodic energy conservation workshops to reinforce education provided during home visits.

CAAs will enter customer data into a database that is compatible with CL&P's and Infoline's in order to track customer participation, measures installed, and other services delivered.

CAAs will conduct follow-up visits to all households where major measures were installed. CAAs will telephone others whose initial referral came through the CAAs to ensure proper delivery of services by the contractors and to reinforce the messages on reducing energy use that were presented during the audits.

For those customers referred by Infoline, Infoline will follow up with telephone calls to ensure that customers received the services they were entitled to.

Budget: $5,130,000 for WRAP and Energy Care combined (see above)

Measuring Success:
The use of a compatible computer system will enable swift and accurate tracking of all participants in the WRAP program, no matter how the referrals come in.

An independent contractor will conduct an evaluation in 2001 to measure energy savings as well as efficacy of the education and counseling components of the program in program year 2000. The contractor will determine whether the goals for participation, lower energy bills, and savings outlined above were met. The contractor will also assess customer satisfaction levels with the program, analyze the structure and service delivery system, and recommend changes that might increase the efficiency of delivery, cost-effectiveness, and/or acceptance of the program by the target population.

CL&P will track and analyze the number of disconnections of service to participants, any decrease in the amount of arrearages owed by participants, and the average monthly payments made by participants in arrearage, in order to compare these data with information in the same categories prior to the start of the program.

Based on the results of the impact evaluations described above, CL&P will estimate the reduction in average energy burden faced by participants.

6,000 households are targeted in year 2000, with 9,795 MWh targeted.

Attachment 4

Howat and Oppenheim, **"Analysis of Low-Income Benefits in Determining Cost-Effectiveness of Energy Efficiency Programs"**

ANALYSIS OF LOW-INCOME BENEFITS IN DETERMINING COST-EFFECTIVENESS OF ENERGY EFFICIENCY PROGRAMS

John Howat
Jerrold Oppenheim

National Consumer Law Center

April 14, 1999

I. INTRODUCTION

The benefits of investing in efficiency measures for low-income homes go far beyond the value of energy, capacity, transmission and distribution costs that are avoided as a result of the investments. Although some benefits are more readily quantifiable than others, it is certain that none of the benefits amount to zero. Accordingly, equity demands that all benefits be accounted for in some manner.

Some of these non-energy benefits are relatively easy to quantify. Others will be quantifiable only by approximation and with difficulty. Still others will be extremely difficult to quantify in a meaningful way. We therefore suggest that, after reasonable efforts at quantification are undertaken, the focus be turned to development of an "adder" that encompasses all that has been learned without embarking on an endless search for unnecessary precision. Non-energy, non-environmental benefits can be computed to be at least equal to energy benefits, although we propose use of an adder that is much smaller.[1] The non-energy benefits

[1] A Non-Energy Benefit Avoided Cost Adder reflects the ratio of the estimated present value in dollar terms of the benefit to total program costs (which equal avoided energy benefits where the benefit cost ratio is 1.0). This ratio is then added to a utility's avoided cost during a cost-effectiveness test of a specific DSM measure or program. This method of calculating and applying an adder is appropriate and justifiable because it allows for a consistent accounting of non-energy benefits irrespective of a utility's particular avoided cost. The adder is intended to provide a framework to be used in the development and evaluation of utility DSM programs, and for the accounting of benefits beyond those directly related to energy savings. The adder is not intended to provide a precise dollar value of non-energy benefits. Our calculation and recommended application of the adder is based on the following assumptions: (1) the energy benefit to total cost ratio of the programs reviewed in the development of the adders specified in this paper is 1.0; and (2) for a given DSM program, there is a positive correlation

that have been identified include both utility benefits and societal benefits.

This analysis follows two parameters. First, is that the benefits identified are in addition to general economic and environmental benefits which accrue to society as a whole. Using an incremental value analysis for low-income benefits results in a calculation that does not double count these broader benefits and results in values which are in addition to those values.

II. UTILITY AND ENERGY SYSTEM BENEFITS

Utility companies incur a range of costs that may be avoided through implementation of effective energy efficiency programs. Among the most quantifiable of these benefits are reductions in payment-related costs that utilities incur. In some cases, these represent transfer payments from non-low income customers to low income customers. These have value to reduce the negative effects of inter-customer transfers but generally should be excluded from a societal analysis. In addition, energy efficiency programs can serve to (1) reduce the number of emergency calls, and (2) from a utility perspective, retain customers who contribute to a utility company's fixed costs.

A. Payment-Related

This section thus examines the effect that energy efficiency programs can have on mitigating the broad range of costs that utilities and their ratepayers incur as a result of unpaid bills by low income customers. Although these costs exist in unpaid bills by non low income customers, the burden falls most heavily on low income customers where bill payment is related to ability to pay and therefore can be effected by energy cost reductions. These benefits have been excluded from calculation of general non-energy benefits to avoid duplication. These costs include arrearages and late payments,[2] bad debt,[3] credit and collection expenses,[4] termination and

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between the level of energy benefits and the level of the non-energy benefits identified in this paper that are generated by the DSM program.

2 Money that is owed utilities from previous consumption and one or more late payments. Biewald, et.al., "Non-Price Factors of Boston Edison's Demand-Side Management Programs: A Review of the Societal Benefits of Energy Efficiency," (1995), p. 14-1.

3 Debt that is incurred if collection efforts are unsuccessful. Id.

reconnection costs,[5] negotiation of payment plans,[6] and regulatory expenses.[7]

Literature review reveals considerable variability in the estimates of payment-related benefits stemming from utility DSM programming.[8] Further, some of these costs and the mitigation benefits associated with energy efficiency programs have not been quantified. We use the information available to develop an appropriate range of adders where feasible and provide qualitative discussion in those instances where benefits have not been well quantified.

Effective programming may include not only the installation of measures to enhance efficiency and comfort, but also counseling and other informational assistance geared toward removing barriers to prompt payment. In comprehensive low-income energy programs, both installation services and information services are provided to customers to increase their ability to reduce and manage their energy-related budgets. For example, Wisconsin Public Service Co. found that adoption of a system of Customer Assistance Advisors resulted in maintenance of write-offs at around 0.25 percent of revenues, compared to an industry average of 0.51 percent. In addition, disconnections dropped to 24 per 10,000 compared to an industry average of 422 (and its own previous rate of around 120 per 10,000).[9]

Further, the Wisconsin study found that the majority of customers in arrears want to pay their bills but lack the resources and/or skills to successfully achieve this. In addition, researchers discovered that: (1) it is in the utility's best interest to begin discussions with customers before arrearage problems get too large, (2) individualized

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4 Expenses associated with credit and collection of unpaid bills, including issuance of shutoff notices, personal contact with customers, disconnection of service, reconnection of service, and payments to collection agencies. Id.

5 Costs associated with disconnecting and reconnecting service in the event of non-payment.

6 Utility personnel costs of negotiating payment plans with customers. Id.

7 Rate cases and other regulatory proceedings that are, in part or in total, devoted to issues related to treatment of customers with outstanding bills or customer complaints against utility companies. Id.

8 The variability of study results is due to both program distinctions and the studies' methodological distinctions.

9 R. Grosse, "Win-Win Alternatives tot Credit & Collections" (Wisconsin Public Service Co. 1997). Information regarding the utility expenditures required to generate these reductions, as well as the dollar value of the reductions, was not provided.

attention to the customer is very important, and (3) the utility can achieve positive results by assuming a "service agency" role and provide assistance to customers in bill management and payment.[10]

1. Reductions in arrearages and late payments

Although it is widely understood that the energy cost burden on low-income households is proportionately three to four times greater than the burden on non-low-income households,[11] studies show that less than one half of utility arrearages are actually attributable to low-income customers.[12] Effective energy efficiency programming targeted to low-income households in arrears can ease the financial burden and thereby increase the ability of low-income families to make utility payments.

There are two components of costs related to unpaid utility bills. One is the cost of non-payment of bills that is recovered through rates. This is a transfer payment from a societal point of view, but a benefit from the utility and ratepayer perspectives (Energy System Test). All items that might be considered transfer payments from a societal point of view are so indicated in the attached table by an asterisk. The second is the administration of these non-payment-related activities (shut-offs, payment plans, etc). These costs can be avoided through low income weatherization and therefore represent an economic benefit to the overall regulated energy system.

Despite the fact that less than one half of total arrearages have been found to be attributable to low-income customers, the arrearage reduction benefits associated with energy efficiency programs should be tabulated in the cost effectiveness analysis of low-income programs. Low-income customers are more likely to be in arrears due

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[10] Id.

[11] J. Oppenheim, "The Utilities," Access to Utility Service, National Consumer Law Center, 1998 Supplement, pp. 30-31 from U.S. Department of Energy/Energy Information Administration, "Electric Sales and Revenue, 1996," Table 14 (1997); U.S. Census, March 1998; "Current Population Survey," Table H-8; U.S. Census, 1990 summary tape, file 3A, Tables H3, P3, P80, P121. See § III.C, Equity Benefits, below.

12 Quaid, M., and Pigg, S., "Measuring the Effects of Low-Income Energy Services on Utility Customer Payment Behavior," *Proceedings of the 1991 Fifth International Energy Program Evaluation Conference*, 1991.

to lack of funds with which to pay utility bills than are non-low-income customers. Since studies show these customers want to pay their bills if they can,[13] DSM measures that release funds are more likely to result in arrearage payments from low-income customers than from others. Thus, DSM programming designed to reduce consumption and thereby free up funds that may be applied toward outstanding bills is more likely to be successful when targeted to low-income households.[14]

Quantification of the scale of arrearage reduction and therefore the benefits associated with reducing related administrative costs has been accomplished through survey analysis of participating and non-participating households. A review of studies of arrearage reduction benefits conducted for the Boston Edison Settlement Board by the Tellus Institute indicates that energy efficiency programs generate reductions in arrearages ranging from $0 to $469 per participating household.[15] In the "Progress Report of the National Weatherization Assistance Program," for example, the authors found a reduced arrearage value of $32 per weatherized low-income household relative to program costs of $1,550.[16] These actual arrearage reductions represent a transfer payment when they are written off as an uncollected debt. However, the administrative costs with the collection costs may be substantial, **generating a non-energy adder of 2.1 percent.**

Similarly, a recent study of a Pacific Gas and Electric low-income weatherization and education program found that reduced carrying charges on arrearages range between $4 and $63 per weatherized household. Based on reported

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13 See § II.A, above.

14 On the other hand, a review of Niagara Mohawk's low-income DSM program showed that customers with the least ability to pay bills paid the smallest dollar amount against arrearages after DSM. Customers with ability to pay reduced their arrearages by an average of $469 after delivery of the DSM program, no doubt at least partially because they had larger arrearages since level of usage is correlated with income. No program costs were reported. Alliance to Save Energy, "Evaluating the Benefits of Comprehensive Energy Management for Low-Income, Payment-troubled Customers," 1992.

15 Biewald, *et al.*, at 14-2 - 14-5. The authors issue numerous caveats regarding the comparison of results from different studies. For example, they cite differences in the measures installed and information provided through different programs, other administrative and programmatic distinctions, and variations of benefit measurement methodologies.

16 Linda G. Berry, *et al.*, "Progress Report of the National Weatherization Assistance Program," at 38, 45 (Oak Ridge National Laboratory, 1997).

program costs of $719 per weatherized household, **a non-energy benefit adder range of 0.6 percent and 8.8 percent is justified.**[17]

2. Reductions in uncollectibles and bad debt write-offs

A number of studies demonstrate that utility DSM and customer relations programs significantly reduce the level of utility uncollectibles and bad debt write-offs. Such programs also cut costs associated with collection, termination and reconnection, negotiation and administration of payment plans, tracking hardship accounts, other administration, regulatory response, and complaint resolution.[18]

In Colorado, for example, write-offs dropped 18 percent at weatherized homes. Further, arrearages dropped 26 percent, emergency gas assistance calls dropped 74 percent, and bills were reduced 22 percent. Total annual benefit to the utility is estimated at $30.56 per participating household on a $2417 per household cost, not counting reductions in complaints and collection costs, increases in comfort and health, and increases in discretionary income.[19] The present value of these benefits is $204.72 per participating household.[20] **The Colorado reduction in payment-related costs thus generated a non-energy benefit adder of 8.47 percent.**

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[17] Lisa A. Skumatz, Chris Ann Dickerson, "Extra! Extra! Non-Energy Benefits Swamp Load Impacts for PG&E Program!" 1998 Summer Study on Energy Efficiency in Buildings Proceeding, pp. 8.301-8.307 (American Council for and Energy Efficient Economy, 1998). In the study, present values were calculated based on a ten year lifetime, discounted at four percent annually. Items in bold are summarized in the attached table.

[18] Payment assistance programs yield similar types of benefits. For example, the Clark County (Washington) Public Utility District capped low-income families' gas service payments at nine percent of income starting in 1988, at a cost to it of $450,000 per year. The program also provided positive assistance to customers in upgrading bill management and payment skills. Over two thousand customers participated in the program, which yielded the following results: (1) Write-offs dropped 36 percent, saving $300,000 per year; (2) disconnections dropped 65 percent; (3) delinquent balances fell from 67 percent of the eligible population to 13 percent. Collection costs saved were about $100,000 per year at the rate of $108 per customer in arrears per year. Per customer payments increased from $29 per month to $52, as customers felt more hopeful about handling the more affordable payment. Thus the direct annual utility benefits of about $500,000 exceeded total program costs by 11 percent, generating a one-year benefit cost ratio of 1.11:1. Weiss, "Low-Income Assistance Pays for Itself," Northwest Energy Coalition (1998).

[19] J.K. Magouirk, "Evaluation of Non-energy benefits from the Energy $avings Partners Program," 1995 Energy Program Evaluation Conference, Chicago, pp. 155-175 (1995).

[20] The Colorado study reported savings only for the first year after weatherization. We calculated the present value of savings over measure lifetimes based on a ten-year lifetime, discounted at 4 percent annually.

Another study found that all benefits associated with reduced uncollectibles range between $16 and $58 per weatherized household.[21] With the reported total program cost of $719 per household, **this benefit estimate produces a range of avoided cost adders of 2.2 percent to 8.1.**

These are transfer payments from a societal point of view and benefits from a utility/ratepayer perspective.

3. Reduced Collection Costs

In a 1994 analysis, Roger Colton found that utility companies incur significant costs associated with collection activities, including telephone contacts and premise visits with customers. He further found that implementation of low-income DSM programs generates substantial utility collection-related expense savings.[22] In testimony before the Pennsylvania Public Utilities Commission, Columbia Gas Company reported the following costs associated with each instance of the various collections activities:[23]

Activity	Cost
Telephone Contact	$ 1.28
Premise Visit	18.09

This table does not reflect the costs associated with collection and credit agency fees. Since these entities usually work on a commission basis, it may be assumed that the costs reflected in the above table would be higher were collection agency fees to be included.

Colton's analysis does not include estimates of program costs that would be incurred to mitigate the reported collection expenses. We therefore do not provide an

[21] Skumatz at 8.307.
[22] Colton, "Identifying Savings Arising from Low-Income Programs," National Consumer Law Center, 1994, p. 16.
[23] Id. at 3.

estimate of an adder to be applied to the non-energy benefits identified by Colton.

1. Reduced Termination and Reconnection Costs

Another set of utility and ratepayer costs avoided through implementation of DSM programs is the processing and distribution of shutoff notices, as well as the disconnection and reconnection of customer accounts. The table below is based on the Pennsylvania PUC testimony mentioned above, and reflects the costs associated with each instance of the reported activity.[24]

Activity	Cost
Shutoff Notice	$ 0.75
Disconnection	21.92
Reconnection	43.84

The identified costs refer only to those incurred by the utility company, and not to the customer's costs. As noted previously, Colton does not estimate the program costs that would be incurred to mitigate the reported collection expenses. We therefore do not provide a non-energy benefits adder based on his analysis.

However, Skumatz, *et al.* quantified avoided utility costs that may be generated through implementation of DSM programs, including notices, customer calls, and termination and reconnection costs. The Skumatz study reported these costs to range between $2 and $12 per weatherized household.[25] Under their reported total program cost of $719 per household, **a range of avoided cost adders of 0.3 percent to 1.1 percent accounts for this set of non-energy benefits.**[26]

1. Reduced Costs of Negotiation, Administration of Payment Plans,

[24] Id.

[25] Skumatz at 8.307. The variance in costs reported by Colton and Skumatz is due largely to the fact that Colton reports the utility cost of each instance of the particular collection activity, while Skumatz reports an average over all participating households.

[26] This is reported in the attached table under "Reconnection and Termination" since the other elements are not otherwise quantified.

Complaint Resolution and Tracking

The Columbia Gas Company reported that it incurs significant costs in negotiating payment plans with individual customers.[27] Accounting for time of customer service representatives and clerical worker along with associated overhead, Columbia Gas estimated that in 1989 it incurred a cost of $14.64 for each individual payment plan negotiation.[28] To the extent effective utility DSM programs make bills more affordable, they simultaneously reduce the need for utility companies to incur costs associated with payment plan negotiation. However, we do not have sufficient data to calculate an adder for this non-energy benefit category.

2. Reduced Regulatory Costs

Utilities incur regulatory costs in dealing with payment-related problems. Such regulatory expenses in this context include the portion of rate cases devoted to issues generated by inability to pay, rulemaking attention to payment-related issues, and regulatory attention to individual complaints.[29] Effective utility DSM, customer relations and customer education programs reduce these costs. Due to insufficient data, we do not attempt to quantify this benefit at this time.

3. Reduced Rate Discount Payments

Many utility companies offer reduced or negotiated payment schedules for customers with limited ability to reduce overdue balances or make full and prompt bill payments. Increasing customers' ability to pay through enhanced end-use efficiency and education regarding available social services reduces the foregone revenues associated with reduced rate discounts. Further, as a low-income household's consumption decreases as a result of implementation of DSM measures, low-income discounts paid by all of the service territory's ratepayers also decrease. The Skumatz study includes an estimated range of $42-270 per weatherized household to account for this non-energy benefit.[30] Based on reported program costs

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[27] Colton at 7.
[28] Id.
[29] Id. at 6-7.
[30] Skumatz at 8.307.

of $719 per weatherized household, **an adder of 5.8 percent - 37.6 percent is appropriately applied to cost-effectiveness testing.**

This may be a transfer payment from a societal point of view and a benefit from a utility/ratepayer perspective.

4. Avoidance of Decreased Sales/Maintenance of Contributions to Fixed Costs

Niagara Mohawk's Affordable Payment and Arrearage Forgiveness Program was designed with the objectives of improving both relations with "payment-troubled" customers and company profitability. The Program's goals were to increase the regularity and total amount of payments by participating customers, increase the use of available assistance through programs such as the Low-Income Home Energy Assistance Program (LIHEAP), decrease the number of collection actions for participating customers, and eliminate arrearages of participating customers. The program reduced billing shortfalls and bad debt write-offs while retaining customers paying a portion of their monthly bills.[31] Evaluators noted that as an alternative to the program, the company could terminate service to customers with payment problems. However "...from an economic perspective, as long as customers can cover variable costs, it makes economic sense to serve them."[32] Fixed costs are incurred whether or not a customer consumes electricity. Maintaining a customer who pay enough to cover all allocated variable costs plus makes some contribution to fixed costs contributes more to net income than does termination of service to that customer. This is similar to the rationale for economic development rates for industrial customers.

Thus, as long as negotiated customer payments combined with payment assistance exceed variable costs, there is a utility and ratepayer benefit generated from incremental contributions to fixed costs. However, we currently lack sufficient data to quantify this additional benefit, which is a transfer payment from a societal

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[31] Response Analysis Corporation, "Niagara Mohawk Power Corporation Affordable Payment and Arrearage Forgiveness Program," p. 1-3 (1992).
[32] Id. at p. 3-9.

point of view but a benefit from a utility/ratepayer perspective.

B. Reduced Emergency Calls

1. Gas

Several analysts have assessed the health and safety impacts of low-income weatherization and DSM programs. Many low-income households have old and poorly maintained space and water heating systems that present health and safety risks.

For example, a 1997 evaluation of Louisville Gas and Electric Company's Energy Partners Program[33] conducted by Proctor Engineering Group included a tabulation of the frequencies of various health and safety problems encountered by program personnel.[34] Among participating households, 23 percent had gas leaks, 26 percent had inadequate draft for space or water heaters, nine percent had high carbon monoxide levels (100-400 ppm), seven percent had very high carbon monoxide levels (over 400 ppm), and one percent had very high carbon monoxide levels and inadequate draft on the same appliance. The report characterized the combination of very high carbon monoxide levels and poor draft as a "potentially lethal safety problem," and noted that the program provided significant health and safety benefits to participants by reducing the risk of illness or death from high levels of noxious combustion gasses, fires, and explosions resulting from gas leaks.[35]

In addition to mitigating costs directly associated with illness or death as noted above, effective DSM programming that includes maintenance and repair of space and water heating appliances reduces the need for gas utility companies to incur costs associated with making emergency calls to deal with potentially hazardous problems. Public Service Colorado estimated this savings to average nearly $16 per weatherized household during the first year after delivery of weatherization services.[36] Skumatz

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[33] Louisville Gas and Electric Company's Energy Partners Program is designed to reduce the energy consumption of low-income and "payment-troubled" customers. Program goals included saving 15%-20% of participants' energy usage; reducing bills and therefore disconnections, arrearage levels and collection actions; and improving the health and safety of participants. Blasnik, "Impact Evaluation of Louisville Gas and Electric Company's Energy Partners Program: Final Report," (1997), p. 1.

[34] Id. at 39.

[35] Id. at 40.

[36] Skumatz at p. 8.305.

estimated the value over time of utility benefits associated with fewer emergency gas calls to range between $84 and $170, **resulting in an adder range of 11.6 percent to 23.6 percent.**

2. Electric

While gas service calls have the most significant impact on energy system costs which can be avoided as the result of DSM programs, the electric distribution utilities have some added costs in responding to customer requests which result from poor quality or malfunctioning electric systems. Unsafe and hazardous conditions as well as disputes in payment between owner and renters often results in service calls which can be avoided as the result of a well planned and executed energy efficiency program. There has been little hard analysis on the exact costs of these services but they are certainly a component in the overall cost of service.

II. SOCIETAL BENEFITS

In addition to generating benefits associated with direct energy savings and savings to utility ratepayers and shareholders, utility low-income DSM programs generate a range of benefits to society at large. However, societal benefits are often very difficult to quantify. Some societal benefits may be considered "transfer payments" among sectors within society, thus raising questions about the application of certain quantified benefits in cost-effectiveness testing while others clearly represent costs avoided by some sector of society (either public or charitable).[37]

Among societal benefits are the following: (1) incremental economic development associated specifically with delivery of DSM services to low-income households; (2) maintenance of the real estate tax base and reduction of public expenditures associated with delivery of medical, firefighting and fire prevention, and social services; operation of homeless and housing programs; and unemployment payments; (3) increased equity; and (4) benefits to low-income people, including housing, reduced moving and homelessness, maintenance of utility services, improved property values, and improved health. We deal with each of these benefit categories

[37] Benefits that may be considered transfer payments are noted in the attached table with an asterisk.

below.

A. Incremental Economic Development

Investments in energy efficiency lower consumer energy expenditures, thereby allowing increased spending in other sectors of the economy. While specific changes in total employment generated by energy efficiency expenditures depend on the structure of a local or regional economy, research has generally demonstrated that increased non-energy expenditures produce net employment gains as well as other contributions to economic well being.[38] These have been incorporated into the general economic benefit calculations made to support a general economic adder.

Energy expenditures typically represent cash outflows from a regional economy. Efficiency-based expenditure reductions are generally redirected in a manner that, particularly after accounting for multiplier effects, produce significant net employment and income gains. Further, the electric and gas utility industries, as well as the oil and gas mining industries, are among the most capital-intensive in the economy. Redirecting expenditures away from these industries and toward more labor-intensive sectors, such as retail trade or services, results in total employment and income gains.[39]

There is an incremental economic development benefit associated with energy efficiency investment in low-income households. Accepted macroeconomic theory holds that, as income declines there is an increasing propensity to spend and a proportionate decreasing propensity to save.[40] Therefore, in the case of low-income households, all savings stemming from energy efficiency improvements are likely to be immediately redirected into the local economy. Higher income households are more likely to save a portion of the savings, thus reducing the economic "ripple effect" that re-spending would create. To our knowledge, this incremental economic development benefit has not been quantified, so we treat it in a qualitative manner

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[38] See, *e.g.*, Skip Laitner, *et al.*, "Energy Efficiency as an Investment in Ohio's Future," p. 30 (American Council for an Energy Efficient Economy, 1994).
[39] Id. at 31.
[40] See, *e.g.*, Paul A. Samuelson, Economics, pp. 210 - 215 (McGraw-Hill, 1976).

for the purposes of this analysis.

B. Public Funds

Utility DSM programs reduce the need for a wide variety of public expenditures. Below, we review the positive effects that DSM programs have on public expenditures in the areas of healthcare, public safety, housing, housing values, unemployment insurance, and social services.

1. Health

The elderly poor are particularly susceptible to weather-induced health problems.[41] Indeed, hypothermia and hyperthermia are examples of potentially fatal health conditions that are most common among elderly people with limited ability to pay for adequate levels of energy service.[42]

Energy efficiency programs targeted to low-income mitigate a variety of health effects and the costs associated with treatment. An obvious example is that weatherization combats hypothermia and the use of carbon-monoxide-producing appliances. One study estimates that the value of reduced illnesses and increased health is $1,300 per weatherized household.[43] Under the reported program cost of $719 per weatherized household, **an adder of up to 181 percent reflects this value.**

2. Fire

Many low-income households have old and poorly maintained space and water heating systems that present safety risks to occupants.[44] Gas leaks in space heating and water heating equipment pose the threat of a house fire. Further, high utility bills and service disconnections lead to use of fire-hazardous alternative heating

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[41] See § III.D.7, below.
[42] Spade, *et al.*, "The Energy Affordability Crisis of Older Americans: An Examination of the Hazards to Health and Well-being Posed by the Growing Incidence of Unmet Home Energy Needs," p. 28 (National Consumer Law Center, 1995).
[43] Skumatz at 8.307.
[44] See § II.B, above.

sources, such as electric space heaters or gas grills.[45]

Much as effective weatherization programming reduces the need for emergency gas service calls, it too reduces public expenditures for fire fighting and prevention. The Oak Ridge National Laboratory's "Progress Report of the National Weatherization Assistance Program" concludes that the value of reduced incidence of fire attributable to weatherization activities is $3 per weatherized household.[46] **Therefore, an adder of less than one percent reflects this benefit.**

3. Building Inspection

Low-income Weatherization Assistance and utility DSM programs include components that improve a building's heating system and envelope.[47] To the extent that these programs are successful in bringing substandard buildings up to building and health codes, they reduce the need for building inspections.

4. Homeless Shelters

As noted in Section III.D.3, below, DSM programs contribute to the prevention of homelessness and housing abandonment by enhancing energy service affordability and by reducing the number of service terminations that lead to loss of residency. Reductions in homelessness have the added public funds benefit of reducing the financial strain on homelessness shelters.

5. Maintenance of Real Estate Tax Base

As noted, weatherization aids in the prevention of housing abandonment.[48] In addition, home energy efficiency investments increase housing values. For example, one study found that home values increase by 20.7 times the annual reduction in fuel use.[49] Because real estate tax rates are directly tied to property valuations, increased housing value caused by home energy efficiency investments are directly tied to

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[45] Spade at 36.
[46] Berry, *et al.*, at 38, 39. The report does not distinguish between public and private costs of fire avoided by the Weatherization Assistance Program.
[47] Id. at 7.
[48] See § III.D.3, below.
[49] Nevin, *et al.*, "Evidence of Rational Market Valuations for Home Energy Efficiency," The Appraisal Journal, p. 403 (Appraisal Institute, 1998).

maintenance or enlargement of the real estate tax base.

6. Housing Programs

Low-income DSM and Weatherization programs include components that reduce the need for publicly funded housing agencies to expend funds. For example, agencies that deliver low-income weatherization services often work with local housing authorities to improve building shell and heating system conditions. The absence of these services would require expenditures by the housing agency to either improve sub-standard conditions or achieve optimal energy efficiency levels.[50]

7. Reduced Unemployment Insurance Payments

As noted above, there is an incremental economic development benefit associated with low-income DSM programs. This benefit, which may be stated in terms of increased employment and personal income, carries an added public funds benefit of reduced unemployment insurance payments. Evaluation of the National Weatherization Assistance Program referenced a non-energy benefit of avoided cost of unemployment benefits to be associated with the program. This benefit was estimated to be $82 per weatherized household, **justifying the use of an adder of 5.29 percent.**

This may be considered a transfer payment from a societal point of view but a benefit from a utility/ratepayer perspective.

8. Cost Reduction from Efficiencies in Social Service Delivery

Weatherization Assistance and utility DSM programs can incorporate components geared toward referring participants to other available social services, thus reducing the costs associated with outreach and administration of these other programs. For example, many households that receive weatherization assistance also receive a referral to separate assistance programs such as the Low Income Home Energy Assistance Program. The per-client outreach costs of the referred program are thus reduced.[51]

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[50] Interview with Art Wilcox, South Middlesex Opportunity Council (1999).
[51] Id.

C. Equity

The energy cost burden[52] of a low-income household is three to four times higher than that of a median income household.[53] For example, expenditures for electricity by low-income households represent, on average, 7.7 percent of their total income; the very poor, living at less than 50 percent of the federally-determined poverty level spend 23 percent. In contrast, the average residential consumer spends only 2.4 percent of income on electricity.[54]

Clearly, households qualifying for the federal Weatherization Assistance Program cannot reconcile monthly income with expenses for basic necessities Paying energy and utility bills requires that other necessities must be foregone. This energy budget dilemma is faced uniquely by the poor.[55]

The equity benefits of energy efficiency programs within the low-income community, represented by the reduced societal disparity in proportionate household energy expenditures, are thus **equal to the energy cost savings benefits** of the programs.[56] This is true because each energy or utility dollar a low-income household is not required to spend reduces the energy burden of that household, thereby reducing the energy burden "gap" between the poor and non-poor. The societal benefit stemming from the reduction of this gap is reflected not only by increased fairness, but also by the reduced requirement of low-income households to forego other

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[52] The energy burden refers to percentage of household income devoted to home energy costs.
[53] Tannenbaum, et. al. "Low-Income Energy Services in a Competitive Environment," Energy Center of Wisconsin. 1998. Also, Argonne National Laboratory, "Residential Energy Consumption Survey" reported in Rabago, et. al. "An Alternative Framework for Low-Income Electric Ratepayer Service." 1992. p. 2.
[54] Computed by J. Oppenheim, "The Utilities," Access to Utility Service, National Consumer Law Center, 1998 Supplement, pp. 30-31. from U.S. Department of Energy/Energy Information Administration, "Electric Sales and Revenue, 1996," Table 14 (1997); U.S. Census, March 1998; "Current Population Survey," Table H-8; U.S. Census, 1990 summary tape, file 3A, Tables H3, P3, P80, P121.
[55] The concept of "Shelter Poverty" was developed initially by Michael E. Stone in the mid-1970s and more recently in Shelter Poverty: New Ideas on Housing Affordability, (Temple University Press, 1993) Shelter Poverty is a framework used to demonstrate that non-shelter necessities must compete for left-over dollars after shelter (housing and utility) costs are taken "off the table" to avoid homelessness.
[56] In a 1996 national study, the U.S. Department of Energy found that weatherization saved 33.5 percent of the gas space heating cost of an average low-income household. Berry, *et al.*, p. 22.

necessities. The public, in recognition of the benefit associated with reduction of the energy burden gap, has shown strong support for taking care of the energy needs of low-income households.[57] **Assuming that the energy savings benefit over time of a given DSM program is at least 75 percent of total program costs, it is appropriate to apply an avoided cost adder of 75 percent to this non-energy benefit.**

D. Low-Income Benefits

1. Housing Development

Residential energy efficiency programs may appropriately be viewed as housing programs. The broad concept of housing includes far more than merely the physical structure of a dwelling. Rather, housing may be understood as a disparate but *inseparable* bundle of goods, services and qualities, including shelter, location, investment, privacy, proximity to amenities, and accessibility to utilities and other tangible services, which together comprise a household's living arrangement. When viewed in this light, it is obvious that action of most any kind directed at any one aspect of the bundle's attributes will have repercussions on other aspects or attributes.[58]

Accordingly, energy efficiency programs that improve housing development economics, reduce customer payments to utilities, reduce homelessness, improve housing maintenance, maintain or improve property values, reduce housing

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[57] There is overwhelming public support for programs to ensure that all households have their basic energy needs met. For example, a national survey found that 89 percent of those with an opinion favor federal low-income energy payment assistance and 79 percent of those with an opinion favor an increase in such funding. Behavior Research Center, "Public Opinion National Survey on Low-Income Home Energy Assistance Program," p. 2 (1998). In a 1997 survey conducted by El Paso Electric Company, respondents in aggregate rated the factor of meeting everyone's basic energy needs as highly important. This factor received an aggregate rating of 8.9 on a scale of 0 (not at all important) to 10 (extremely important). Guild, *et al.*, "Southwest Town Meeting on Electricity Issues" (El Paso Electric Company, 1997). In addition, results of a 1987 residential survey of Connecticut residents demonstrate strong public support for energy cost assistance to low-income and elderly persons. Further, the study identified strong public support for the notion that access to energy for residential use is a right in our society. John M. Kennedy, "Public Support for Residential Energy Assistance," 71 Sociology and Social Research 308 (1987).

[58] Montgomery *et al.*, Housing in America: Problems and Perspectives, 1979. pp. 3-6.

abandonments, reduce moving costs and reduce adverse health effects must be viewed as generating non-energy benefits in addition to the energy savings benefits.

Unfortunately, while many of these benefits may lend themselves to quantification through careful analysis, little work has been in this area to date. We review below some of the existing literature related to housing and community development aspects of weatherization and utility DSM programs, and provide quantitative estimates of such benefits where feasible.

The economics of low-income housing development are usually characterized by a precarious balance between rigid development costs, limited prospective income streams, and a developer's ability to obtain attractive financing and subsidies. DSM programming targeted toward new residential construction can enhance these economics in a number of ways. First, DSM programming can have a mitigating effect on the marginal cost of meeting or exceeding the energy requirements of the Massachusetts Building Code. Overall project economics would then be improved by the resulting reduction in this development cost. In addition, DSM measures that improve the efficiency of energy usage in the new facility reduce the level of future energy expenditures and therefore the operating cost associated with the facility. Reduced strain on operating budgets of residents and/or property managers may induce some financial institutions to offer relatively attractive financing terms.[59] These benefits will tend to be project-specific.

2. Reduced Mobility

An analysis conducted by the Upjohn Institute of the determinants of the decision of low-income renters to move out of their dwellings reveals that low-income

[59] This is a similar concept to that which was behind the development of the "Home Energy Rating System" that has been implemented in a number of different states (*e.g.*, Vermont). Simply put, participating financial institutions offer reduced mortgage rates for purchase of dwellings that exceed certain energy efficiency standards.

renters are willing to pay sizable portions of their annual incomes to not move.[60] The study further reveals that there is a very high psychological and financial cost of mobility among low-income renters, particularly those who are elderly or whose households include children. The study found average moving costs for "typical" low-income households to be between ten percent and 20 percent of annual income.[61]

One important implication of the results of the Upjohn Institute Study is that, given the high cost of mobility to low-income households, there is particular value to policies and programs that reduce the need of these households to move. Low-income DSM and weatherization programs reduce mobility in at least three ways. First, energy efficiency improvements reduce the level of energy/utility expenditure required to attain a minimal living standard thus freeing up funds to pay rent or other required housing costs. Second, weatherization improvements ameliorate dangerous or substandard conditions in heating equipment or building shell that might otherwise force a household to relocate.[62] Finally, some utility programs include arrearage forgiveness or payment plan components that result in fewer service terminations and, therefore, reduced mobility.[63]

Researchers estimate the value of reduced mobility among program participants was as much as $840 per weatherized household.[64] **Under the study's reported program cost of $719 per weatherized household, an adder of up to 117 percent is justified as a quantification of this non-energy benefit to low-income participants.**

3. Reduced Homelessness, Housing Loss, Housing Abandonment

Studies have demonstrated the clear link between homelessness and utility terminations. As indicated above, energy efficiency programming and customer

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[60] Bartik, *et al.*, "Maximum Score Estimates of the Determinants of Mobility: Implications for the Value of Residential Attachment and Neighborhood Amenities," Upjohn Institute Staff Working Paper 90-01, pp. 1, 10-11(1990).

[61] Id. at 10-11. A "typical" low-income household, based on overall means of the sample population, consisted of a non-minority household, with no spouse present, two children, and a head age 44, which had been at its current residence for 48 months.

[62] See § II.B and III.B.2, above.

[63] See § II.A, above and III.D.3, below.

relations help to ameliorate late payment problems.[65] It follows that terminations may also be reduced as a result of such programming.

According to surveys conducted by the Energy Coordinating Agency of Philadelphia and Institute for Public Policy Studies of Temple University, there was an average of over 60,000 gas electric and water service terminations each year in the city during the years of 1984 through 1989. The study further found that, of homes where utility service was terminated, 32 percent of electric and 24 percent of gas cases led to abandonment within one year of the utility termination. Through a name match between Philadelphia Electric Company's list of termination notices and lists of homeless adults served by the City of Philadelphia, the study found a discernable relationship between utility termination and homelessness. In surveys of individuals living in emergency shelters, 7.9 percent of respondents cited utility terminations as the reason for their homelessness. (Higher percentages cited related causes, such as "eviction for non-payment" and lack of housing in the income range as the causal factors.) The study noted that of the many factors contributing to homelessness, mitigation of high energy costs is among those "most susceptible to remedy."[66] Similarly, a study of homelessness in Northern Kentucky indicates that utility shutoffs were among the primary causes of homelessness in that region.[67]

The studies cited above do not provide the information necessary to quantify or project the benefit of homelessness prevention associated with energy efficiency programming. Similarly, they do not project the costs associated with such programming.

4. Reduced Loss of Service Due to Termination

By enhancing energy affordability and arranging payment plans with

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[64] Skumatz at 8.307.
[65] See § II.A, above.
[66] Liz Robinson, "An Examination of the Relationship between Utility Terminations, Housing Abandonments and Homelessness," pp. 1, 2 (Energy Coordinating Agency of Philadelphia, 1991).
[67] William K. Woods, *et al.*, "Homelessness and Low-Cost Housing in Northern Kentucky," p. 2 (Northern Kentucky Coalition for the Homeless and Applied Information Resources, 1990).

customers in arrears, DSM programs reduce the number of service terminations suffered by customers. Researchers estimate that the value of fewer service terminations to customers is as high as $425 per participating household.[68] Under the reported program cost of $719 per weatherized household, **an adder of up to 59.1 percent would be applied to reflect this value.**

5. Improved Maintenance, Maintenance of Property Values

Literature review demonstrates a link between residential housing values, energy costs and energy efficiency characteristics.[69] In a review of seven studies conducted between 1970 and 1985, a study published in *The Appraisal Journal* found that (1) value of energy efficient homes with low structural heat loss was $3,248 higher than comparable inefficient homes, and (2) home value increased by about $20.73 for every $1 decrease in annual fuel bills.[70] In addition, many DSM measures contribute to the maintenance of property by improving thermal integrity and heating system efficiency.

Evaluation of the National Weatherization Assistance Program computed a non-energy benefit of increased property value associated with the program. This benefit was estimated to be $126 per weatherized household,[71] **justifying an adder of 8.13 percent.**

6. Health

Older people living in poverty are more likely than their non-poor counterparts to experience rapidly declining health and to develop difficulties performing routine daily activities as they age. Thus, low-income individuals are at a much higher risk of requiring nursing home care as they age.[72] Further, among those most likely to develop hypothermia are the poor who can not afford to pay for adequate home

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[68] Skumatz, p. 8.307.
[69] Nevin, *et al.*, at 403.
[70] Id.
[71] Berry, *et al.*, at 38.
[72] Interview with Raymond Coward, Dean of the School of Health and Human Services, University of New Hampshire from "USA Today Magazine," April 1998, v 126 n2635 p. 5.

heating.[73] In addition, low-income households are at increased risk of fire and exposure to hazardous fumes due to use of unsafe heating sources because of utility terminations.[74] Finally, high energy burdens cause low-income households to forego expenditures on preventive health measures and nutritional food items.[75] DSM programs thus improve participants' health by preventing such dangers as hypothermia, carbon monoxide poisoning, and fires. We have not quantified this benefit.

III. CONCLUSION

Based on the foregoing presentation of benefits to society, individuals, utilities, and ratepayers from delivery of comprehensive low-income energy efficiency programs, a benefit adder of between 17 percent and more than 300 percent could reasonably be incorporated to represent the incremental value of a low-income focus beyond the general societal, economic, and environmental benefits of efficiency programs.

Furthermore, this omits a benefits that have not been quantified in the literature but that can be reasonably quantified as follows:[76]

* Reductions in electricity emergency calls can be extrapolated from experience with gas. Assuming the rate of electricity emergency calls is 20 percent that of gas, a reasonable estimate of the avoidable cost is 2 percent - 4.5 percent of avoided costs.
* The incremental economic multiplier effect from low-income energy efficiency programs due to increased level of spending can be reasonably estimated at 1 percent-2 percent of avoided cost.
* A reasonable lower bound for increased property values can be calculated as a $4000 improvement in value of an $80,000 home, or 4 percent - 5 percent of avoided cost.
* The value of increasing the ability of the housing market to sustain affordable housing for low-income families is difficult to precisely measure. However, it can be

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[73] Bonnie Guiton, "Special Report on Cold Stress and Heat Stress," p. 1 (U.S. Office of Consumer Affairs).
[74] Colton, 1993.
[75] Cambridge Systematics, Inc., "Hard to Quantify Benefits and costs Scoping Study," prepared for the New York Low-Income Evaluation Task Force. 1994
76 Interview with Stephen Cowell, Conservation Services Group. Documentation to be provided.

estimated by placing a reasonable value of 50 percent of the value established for maintenance and improvement in housing values. This would translate to an adder of 2 percent - 4 percent of avoided cost.

* The value of efficiencies in social service delivery can be estimated by assuming each household provided with comprehensive energy efficiency services also receives one referral at a (conservative) average cost savings of $20. This would translate to an adder of 3 percent.

At the lower bound, these estimates add 12 percent of avoided cost to the computation of a reasonable adder, without counting other nonquantified cost savings. When added to the lower estimates appearing in the literature and described in this paper, the total approaches the consensus value of a 50 percent adder. Thus 50 percent represents a value that is close to the bottom of a reasonable range of benefits from low-income energy efficiency programs.

As the table that follows displays, an adder of more than triple avoided costs can be justified for all low-income DSM programs — more for technology-specific measures such as gas-related, space-heating measures, and new construction.[77] There is a wide range in estimates and in the precision with which they are computed; for many factors, no quantification has been done to date. Nevertheless, the lowest estimate of an adder to avoided cost is 17 percent without counting unquantified benefits such as avoided utility collection costs, avoided administrative costs, avoided regulatory costs, incremental economic development benefits, public fund savings (*e.g.*, Fire and Building Departments), and reduced homelessness.

The mid-point of the range of estimates — still not counting the unquantified benefits — is 172 percent of avoided costs. Even taking only a third of the range (going one-third of the distance from low to high) yields an adder of 103 percent for all low-income programs.

Indeed, removing the estimates for equity and all the items that may be considered to be transfer payments from the societal perspective — still not counting the unquantified benefits — and taking only a third of the range instead of the midpoint — yields an adder of 59 percent.

In the spirit of compromise, at least as a starting point for later review as benefit quantification and future low-income DSM program measures are refined, we propose a cost-effectiveness adder of 50 percent of avoided cost for all low-income DSM programs with additional adders as appropriate that are technology-specific, program-specific, or site-specific. We submit that anyone taking the table that follows as a menu, selecting only the benefits and values in which they believe, will be able to justify a 50 percent adder. Analysts have thus reached their justification of 50 percent in different ways but are able to reach a consensus that 50 percent of avoided cost is a reasonable and appropriate adder for low-income DSM programs.

[77] Sources for the table are indicated in the text and footnotes of the paper.

Table 1 Low-Income Benefits as a Percentage of Avoided Cost

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Attachment 5

Summary of Low-Income Assistance Programs

SUMMARY OF LOW-INCOME ASSISTANCE PROGRAMS

The following is a summary of the low-income assistance programs currently in place throughout the United States broken down into the different components selected by each state. Benefits and disadvantages of most options are included.

ASSISTANCE OPTIONS

Dollar Discounts

* Flat lifeline credit -- percent or dollar amount; easily administered, but not highly targeted. Percentage method is more targeted to high-use households; dollar method is more targeted to low usage (who may be lower income);

* Credit offered per kWh usage -- can promote conservation, which addresses the issue of not stimulating usage with a discount (on the other hand, most low-income households have other essential needs to be filled with the money saved from efficiency); for example:

1-400 kWh/month = 30% discount
401 - 800 kWh/month = 20% discount
801 - 1200 kWh/month = 10% discount
Over 1200 kWh/month = flat credit to account for those households which have a need for larger usage (large family, medical needs, etc.);

* Larger credits offered for senior citizens, disabled ratepayers or those who use some type of medical life support. This adds some administrative work but better targets benefits to those most affected by unaffordability;

* Reduction that is a predetermined percentage (10%, 15%, etc.) of bill, with the percentage reduction determined according to income level or federal poverty level (FPL) -- the lower the income, the higher the discount. This also increases administration but better targets the assistance;

* Percentage of Income Payment Plan (PIPP) -- Customers pay a percentage of their income (9%, 10%, 11%, etc) on their bills depending on their level of income in relation to FPL guidelines -- involves the greatest addition to administration but also the greatest targeting and thus is the most efficient use of dollars to increase affordability and decrease payment troubles;

* Waiver of customer reconnection charge -- results in apparent revenue loss, but adding charges to bills of those who already cannot afford to pay does not increase likelihood of payment and may be past point of diminishing returns;

Customer Charge options (advantages and disadvantages similar to dollar discounts, but minimal when customer charge is small)

* Customer charge can be completely waived;

* Customer charge can be frozen;

* Tax on customer charge can be waived; and

* Percentage can be waived according to income level.

ELIGIBILITY

* Households already on another form of state or federal assistance are automatically eligible -- provides ease of administration but misses large numbers of low-income households receiving no assistance;

* Households eligible for LIHEAP are automatically eligible – provides ease of administration but, by itself, leaves out majority of low-income households;

* Customers with incomes at a certain percentage of the state median income (usually 50% or 60%) -- most encompassing but requires agency (*e.g.*, CAPs) to screen incomes of those not receiving assistance;

* Customers who have incomes equal to or lower than a percentage of the FPL -- (same benefits and disadvantages as above);

* For senior citizen programs, age and income levels set the guidelines – household must qualify by age and income so, by itself, eligibility is narrow and administratively burdensome;

* Applicants must have a negative cash flow, cannot be on public assistance, and have a history of broken payment agreements (arrearage management) -- used for arrearage management screening on an individual basis; higher administrative cost and narrower eligibility than simpler screens (*e.g.*, high use, high burden).

NOTE: Most programs have eligibility screens that are a combination of a number of these criteria rather than just one.

COST AND COST RECOVERY OF PROGRAMS

* Most programs range from 0.5 to 5.0 percent of annual utility jurisdictional revenue;

* Funded by utility stockholders -- short-term customer savings but not equitable;

* Funded by residential ratepayers in rates -- since the programs provide non-residential customer savings, it is not equitable to charge only one sector for them;

* Funded by all ratepayers in rates -- equitable since all customer sectors, and shareholders, receive benefits;

* Funded by both stockholders and ratepayers – most equitable since all benefit;

* Option of printing charge to fund these programs on customer bills -- printing one item on bill provides information on one program but invites printing of others (such as economic development or irrigators' rate subsidies).

ENERGY EFFICIENCY/WEATHERIZATION (measure selection depends on budgets and cost-effectiveness)

* Water conservation measures (such as water heater wraps, low-flow showerheads and faucet aerators);

* Compact fluorescent bulbs;

* Conservation educator visits participants' homes;

* Energy audits (may be fuel-blind) conducted to determine weatherization needs;

* Weatherization measures, including attic, wall and ceiling insulation, weather stripping, new windows, boiler repair or replacement;

* Refrigerator replacement (after metering);

* Energy education workshops to instruct on energy efficiency mechanisms and promote conservation;

* Referrals to conservation and weatherization programs and energy and financial management courses;

* Budget counseling; and

* Additional measures for new construction/rehabilitation and multifamily buildings.

ARREARAGE PROGRAMS (Relatively high administrative cost but provide commensurate benefits to all customers due to increased collections and decreased collection costs. Setting individual affordable payment (or percentage of income) plans and larger arrearage forgiveness amounts increases likelihood of success due to customer sense of achievability. Rewarding each timely payment with an incremental benefit encourages development of payment habits.)

* Arrearage forgiven with monthly payment of current bill;

* Affordable monthly payment determined according to income including payment going toward arrearages. Successful completion of the minimum number of months required by utility results in the forgiveness of an equal amount of outstanding debt;

* Participating low-income customers pay a predetermined portion of their bill and a portion of their arrears is forgiven. For example, with each payment made on time and in full, 1/24 or 1/12 of the arrearage is forgiven;

* Fixed monthly payments to arrearages that lead to complete forgiveness after a pre-determined period of time (usually one to three years);

* Participants receive forgiveness set at a certain level, *e.g.*, $250, and must pay the remainder;

* Percentage of arrearage forgiven; and

* Participants pay set amount ($5-$10) a month toward arrearages. If they pay more than the set amount, utility matches the amount toward arrearage.

OUTREACH (All of the options listed below are effective elements of a comprehensive approach)

* Local agencies (community action agencies, Salvation Army, and LIHEAP agencies) help in the application process and refer to the utility -- very effective but limited to the people these agencies can reach;

* Utility sends information on programs through electric bill;

* Annual "utility discount days" scheduled where customers can directly sign up if they are found to be eligible;

* Utility sends out periodic flyers;

* Utility selects participants from a list of customers who meet the state's LIHEAP criteria;

* Local community ministries perform the outreach. Sign up is only available in certain months;

* Negative check-off option. When a customer applies for federal, state, or local assistance, customer automatically is enrolled in the utility program unless opting out of it;

* Utility performs computer match up for automatic enrollment -- may be most effective but raises privacy concerns that must be managed (note partial alternative of post card at benefit sign up to alleviate this concern);

* Ads in newspapers;

* TV and radio spots -- TV is effective but costly (CATV may be an alternative);

* Legal services offer pamphlets and worksheets which are available at their locations throughout the state;

* Community meetings and workshops;

* Flyers posted at social services offices; and

* Utility solicits customers when they have contact with them, *i.e.*, when they call regarding payment trouble or arrearages -- effective time to reach people but audience is limited.

PROGRAM MANAGEMENT

* Community action agencies manage program -- close to community but lack customer data base and utility expertise;

* Utility manages program -- maintains information and expertise but relatively remote from low-income community;

* Independent statewide administrator -- provides uniform program but could add to bureaucracy and stifle local creativity;

* Department of Human Services; and

* State office which handles LIHEAP manages the program.

Note: Many programs are managed by a combined effort from both the utility and social service programs -- many of the most successful programs operate this way, combining the benefits each brings.