A National Study of Ratepayer-Funded Low-Income Energy Programs

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Three well-known researchers within the energy assistance community – David Carroll and Jackie Berger of APPRISE and Roger Colton of Fisher Sheehan and Colton – joined forces in late 2006 and early 2007 to conduct a national study of ratepayer-funded low-income energy programs. Their findings were presented during a plenary forum at the 21st Annual National Low Income Energy Conference in Nashville, Tennessee, on June 6, 2007. Below is the executive summary of their report.

Executive Summary

Policymakers throughout the country have implemented low-income affordability and energy efficiency programs to help low-income households meet their energy needs. For 2005, the LIHEAP Clearinghouse identified more than $2.3 billion in funding through state and local taxes, funds from electric and gas ratepayers, private charitable donations, and other sources. The level of commitment of funds to these programs illustrates the nearly universal understanding that low-income households need assistance in meeting their energy needs.

The purpose of this study is to furnish comprehensive information on ratepayer-funded low-income energy programs. This study includes information on and analysis of the energy needs of low-income households, the legal and regulatory framework supporting ratepayer-funded programs, program design options, and the findings from evaluations of program effectiveness. The study will directly benefit the study sponsors by furnishing information on how they can advocate for and implement new low-income energy programs or make enhancements to existing programs. The study also serves the broader low-income energy community by furnishing a publicly available report on the study findings.

Introduction

This is a multi-sponsor study that was funded by a diverse group of national, state, and local organizations. The study sponsors are:

- AARP
- Citizens Gas & Coke Utility (Indiana Utility Consortium)
- Colorado Governor's Energy Office
- Maryland Department of Human Resources
- Missouri Association for Community Action
- Northern Indiana Public Service Company (Indiana Utility Consortium)
- Oregon Housing and Community Services
- PECO Energy
- Philadelphia Gas Works

- Public Service Electric and Gas (contributor)
- Vectren Energy Delivery (Indiana Utility Consortium)
- Washington State Department of Community, Trade and Economic Development

In addition to funding, these organizations contributed to the study by furnishing information on the low-income affordability and energy efficiency programs in their jurisdictions and helping to identify the key questions of interest for policymakers. While we appreciate the contributions of the study sponsors, it is important to note that the statements, findings, and conclusions in this study are those of analysts from APPRISE and Fisher, Sheehan, and Colton, and do not necessarily reflect the views of the sponsor organizations.

The study focuses on ratepayer-funded low-income energy programs in thirteen states (California, Colorado, Indiana, Maine, Maryland, Missouri, Nevada, New Jersey, Ohio, Oregon, Pennsylvania, Washington, and Wisconsin). Based on data available from the LIHEAP Clearinghouse, ratepayer-funded programs represent about 85% of all state and local funding for low-income energy programs. The programs in the states included in the study account for more than three-fourths of all ratepayer funding for low-income energy programs.

Low-Income Energy Needs Assessment

Policymakers throughout the country have identified the need for low-income energy assistance and have made significant commitments to low-income energy programs. In 2005, there was more than $2.4 billion in funding for the Federal LIHEAP and WAP programs and more than $2.3 billion in funding for state and local low-income energy programs. However, for the same year, the aggregate residential energy bill for low-income households was estimated to be about $32 billion. Policymakers considering the implementation and/or expansion of low-income energy programs need information that helps them to assess the needs of households in their jurisdictions.

In this study, we developed national and state-level statistics on the energy needs of low-income households. The national statistics demonstrate the magnitude of the problem facing low-income households and the organizations that serve them. The state-level data, on the other hand, are more relevant to the policymakers who are attempting to address the energy needs of low-income households in their jurisdictions and advocates who wish to demonstrate the need for low-income programs.

National Statistics

At the national level, we made use of a number of data sources, including:

- *LIHEAP Home Energy Notebook for FY 2005*
- *NEADA National Energy Assistance Survey for FY 2003*
- *SIPP "Measures of Well Being" for 1992, 1998, 2003*
- *DOE Residential Energy Consumption Survey for 2001*

From these data sources, we identified energy need indicators for low-income households.

The LIHEAP Home Energy Notebook for FY 2005 documents the rapid growth of the low-income energy bill and can be used to examine the aggregate need for energy assistance.

- *Energy Expenditures* – Total energy expenditures for low-income households grew rapidly from 2000 to 2005, increasing by over 40% in just five years. While growth in LIHEAP funding partially offset the increasing demand for energy assistance, statistics show that LIHEAP benefits only cover about 5.3% of the total residential energy bill for low-income households.

Energy Burden – The median energy burden for low-income households was 9.9% of income in 2005. By comparison, the median energy burden for households that were not low-income was 2.8% of income.

- *Need for Assistance* – More than 7.1 million low-income households had an energy burden that exceeded 15% of income. The amount of energy assistance needed to reduce energy burdens to 15% of income was about $6.1 billion. At its 2005 funding level, LIHEAP benefits would only be able to cover about one-fourth of this amount.

These statistics demonstrate why state and local policymakers have found it necessary to supplement LIHEAP funds with state and local resources, including ratepayer-funded programs.

Other national research furnishes additional insights regarding low-income energy needs.

- *2003 NEAS* - The 2003 National Energy Assistance Survey found that 88% of recipients reported that LIHEAP was "very important in helping them to meet their energy needs." Without their LIHEAP benefits, 39% of recipients indicated that they would have had to "keep their home at an unsafe or unhealthy temperature" and 39% reported that they would have had "their energy services disconnected or discontinued at a time when it was needed to heat or cool their homes."

- *SIPP "Measures of Well-Being"* - The "Measures of Well-Being" topical module from the 2003 Survey of Income and Program Participation (SIPP) demonstrates that most low-income households keep up with their energy bills, despite the high energy burden. Almost 80% of households with incomes at or below the poverty level pay all of their utility bills.

- *RECS Energy Usage Data* - The national RECS data also show that energy efficiency programs could be a cost-effective way to reduce energy burdens for

These sources demonstrate indicators of need that go beyond the measurement of energy burden.

State Statistics

At the state level, we made use of a number of data sources, including:

- *American Community Survey for FY 2005*
- *NOAA Weather Data*
- *EIA Energy Price Data*

From these data sources, we were able to develop state-level indicators of need that are more directly relevant to state and local policymakers. Examples of the different circumstances faced at the state level include:

- *Energy Expenditures* – Median low-income baseload electric expenditures ranged from about $621 in California to about $906 in Maryland. Median gas expenditures ranged from about $379 in California to $1,020 in Ohio.

- *Energy Burden* – Median low-income baseload electric burden ranged from about 4% to 9% and median gas burden ranged from about 3% to 10%.

Energy Gap Analysis

In setting target affordability levels, policymakers might consider research on the need for energy assistance. Analysts have developed two important indicators of energy affordability – an affordable energy burden and a high energy burden.

- *Affordable Energy Burden* – Roger Colton of Fisher, Sheehan, and Colton has recommended using an affordability standard of 6% of income based on the idea that a household can afford to spend about 30% of income on shelter costs and that about 20% of shelter costs are used for energy bills.

- *High Energy Burden* – APPRISE has proposed an approach for defining "high energy burden" using a model that identified a severe shelter burden as 50% of income or more and energy costs as about 22% of shelter costs. Using that approach, APPRISE has suggested that analysts might use 11% of income as an indicator of "high energy burden."

While individual households may be able to pay more or less than that average for energy, as an overall indicator of need, these statistics have value.

Defining Affordable and High Residential Energy Burden

Fisher, Sheehan, and Colton: Moderate Shelter Burden = 30% of income

Median residential energy costs for low income households = 20% of shelter costs

*Affordable residential energy burden = 30% * 20% =* ***6% of income***

APPRISE: Severe Shelter Burden = 50% of income

Median residential energy costs for low income households = 22% of shelter costs

*High residential energy burden = 50% * 22% =* ***11% of income***

Using data from the American Community Survey (ACS), we developed estimates of the total need for energy assistance for each state using a 5% need standard and a 15% need standard. Even using the relatively high 15% need standard, we found that LIHEAP funding only covers between 6% and 43% of the outstanding need in the states we studied. In the median state, LIHEAP covered about 20% of the need at the 15% energy burden need standard and about 9% of the need at the 5% need standard.

Legal/Regulatory Framework

Policymakers throughout the country have addressed a number of regulatory and legal issues that are common to programs in their adoption, design and implementation. While most states have mandated the creation of low-income affordability programs through specific state action, such legislative direction is not a prerequisite to the pursuit of such programs. When regulators desire to implement a low-income affordability program, sound and readily sustainable regulatory foundations exist, without explicit legislation action, upon which to base regulatory approval. The law is insufficiently developed, however, to judicially require a state regulatory agency to act to adopt affordability programs.

Legislative Authorization

Our research found that states have frequently mandated the creation of low-income affordability programs by statute, thus rendering moot the question of whether the state utility commission has the authority to pursue such programs. Maryland, California, Nevada and New Jersey, for example, all had utility commissions act after the legislature enacted a statute directing the implementation of a low-income program.

Other states have acted to adopt affordability programs without specific legislative authorization.

- *Pennsylvania* - Pennsylvania's commission found that it had the authority to order programs to stop the "wasteful" cycle of repeating service disconnections, reconnections, failed payment plans, and a return to the start of the cycle with another disconnection.

- *Ohio* - The Ohio commission found that it had authority under the state of "emergency" which it found to exist as a result of the tens of thousands of households that were losing their utility service due to the unaffordability of home energy.

- *Indiana* - Indiana utilities found authority to adopt their low-income programs under a statute providing for "alternative regulatory plans," which allow the utilities and the state commission to set aside all or parts of traditional regulation when to do so is in the public interest.

Even state utility commissions that have expressed doubt about their regulatory authority to implement permanent statewide programs have adopted smaller programs using different aspects of their regulatory authority.

- *Missouri* - The Missouri utility commission, for example, has held that it lacks statutory authority to adopt preferential rates. Nonetheless, that commission has approved multi-million dollar programs by electric and natural gas companies to deliver rate affordability and arrearage forgiveness through specifically-dedicated funds.

- *Colorado* - Even before the State Supreme Court decision proscribing preferential rates was legislatively overturned, the Colorado Commission approved a low-income energy efficiency program on the grounds that it was cost-effective. It also approved a rate affordability pilot to test whether it could be shown to be cost-effective.

The legal authorization under which state utility commissions operate can explicitly require the development of a program, can have language that the utility commission interprets to order the implementation of a program, or can merely be interpreted to allow the utility commission to approve a program. No known instance exists where legislation has explicitly proscribed a low-income affordability program.

Future Legal Authority

Our review of affordability programs found that numerous stakeholders have advanced creative justifications upon which to structure their low-income affordability programs. The lines of analysis presented below do not necessarily apply in every state. The application of any given line of reasoning depends upon the specific statutes that exist in any given state.

Foundational Policy Basis for Commission's Existence

Our research found that the regulation of natural gas and electric rates in any given state is governed not only by the statutes that specifically mention ratemaking, but by the statutes setting forth the broad regulatory mission of the state utility commission as well. Invoking such statutes is akin to the work of environmental advocates who historically

have sought to have utility regulators take into account the environmental implications of their decisions. Just as environmental protection can be advanced through enforcement of the "general charge" of a utility commission, low-income protection can be advanced by enforcement of that language as well. For example, many such statutes ***direct*** the utility commission to undertake its duties within the constraint of maintaining public health and safety. The way to conceptualize this approach to low-income rates is to think of these general charges as being the seminal documents of the agency. Policy declarations included in the charter documents of an administrative agency create enforceable obligations on the part of that agency.

Universal Service as a "Public Good"

The notion that assistance provided to low-income households supports the broader public interest is not an unusual idea. In the public utility industry, for example, universal service is considered by many authoritative sources to be a "public good" subject to the financial support of ratepayers as part of the general regulatory oversight of public utilities. The question which presents itself, of course, involves determining how to define "public good" so as to include universal service. Fire hydrants and streetlights, for example, have been found to be public goods. The basic telecommunications network has also been found to be a "public good" as a justification for spreading network costs over all customer classes in support of the promotion of universal service.

Improving Business Competitiveness

An increasing body of research has documented how the problems associated with inability to pay affect the competitiveness of local business and industry as well. Special rates for energy customers, as well as state regulatory decisions regarding ratemaking in the telecommunications industry, frequently are premised on their positive impacts on promoting business competitiveness. These considerations have also supported "implicit subsidies" generated by transferring costs from high-cost rural areas to lower-cost urban areas in both the energy and telecommunications industries. Similarly, assistance to low-wage, poverty-level workers through home energy affordability subsidies can promote the competitiveness of local business and industry.

The Legislative Frameworks

The "legal" framework of energy assistance programs around the nation does not rest exclusively in the regulatory decisions of the various state utility commissions. It rests, also, in the statutory structures upon which many of the study programs are based. These statutory decisions exhibit considerable, though clearly not universal, differences on major program decisions. Patterns do appear, however.

The Scope of the Programs

The "scope" of a universal service program refers to the extent to which all low-income customers within a state are covered by the program.

- *Mandated Electric Programs* - Some state programs are focused on delivering benefits to customers of a particular fuel type. Maine and Maryland, for example, have directed the implementation of a statewide electric universal service program.

- *Mandated Electric and Gas Programs* - States such as New Jersey, Pennsylvania, Nevada and California have all mandated that programs be directed to both natural gas and electric customers.

- *Voluntary Programs* - While Washington has made all programs optional to utilities and Oregon has made programs optional for natural gas utilities, both states have such programs by both natural gas and electric utilities.

The Coverage of the Programs

Most states that have enacted universal service programs restrict those programs to regulated utilities. Programs in New Jersey, Maryland, Pennsylvania and California are legislatively focused on regulated utilities. In contrast, Maine's legislation is specifically directed not simply toward the state's three investor-owned electric utilities, but to Maine's consumer-owned electric utilities as well. In Wisconsin, municipal utilities must, at a minimum, operate local programs that are equivalent to the statewide program.

Program Design

One issue policymakers must face is whether to create a uniform statewide program, or to allow diversity in program design amongst utility service territories.

- *Variable Program Design* - Maine and Pennsylvania allow each utility within the state to develop its own program design, so long as those designs are consistent with state prescribed minimum standards.

- *Uniform Program Design* - New Jersey, Nevada and Maryland have all implemented uniform statewide programs.

- *Voluntary Program Design* - Washington relies upon voluntary program proposals that are initiated by each individual utility, as does Oregon for natural gas utilities. While those program designs are similar, law or policy does not dictate the similarity.

The Maine Office of Public Advocate (OPA) had a unique approach. In its essence, the OPA urged that there should be rebuttable presumption favoring a uniform program. According to the OPA, "all three utility-sponsored programs should be similarly designed, except to the extent that demonstrably different customer needs exist." While the Maine Commission rejected that approach given time constraints on the design and

implementation of programs in the state, the Commission held open the possibility of imposing such a future requirement.

Program Support

Program support involves primarily the collection of funding in support of the low-income affordability programs. One primary question is whether program funds should be collected from all customer classes or from the residential customer class alone. Many of the Pennsylvania CAP programs, along with the voluntary programs in Oregon (natural gas only) and Washington, are based on financial support provided only by the residential class. In contrast, the Nevada legislation directs that funding will be collected from all "retail customers." Program funding in Maryland and New Jersey, too, are statutorily directed to be collected on a per unit of energy basis from all customers.

Efficiency Investments as a Rate Affordability Program Component

Every state that has adopted a home energy affordability program has incorporated an energy efficiency component into that affordability initiative. Differences appear, however, in the manner in which the efficiency program is integrated into the broader affordability effort, in the means of targeting the efficiency investments to particular households, in the linkage between the rate affordability and efficiency program components, and in the cost recovery for the program components.

Connection between Affordability and Efficiency

The connection between the rate affordability and energy efficiency components of home energy affordability programs varies widely by state. In some states the connection is explicit. Maine regulators have held, for example, that the obligation to deliver energy efficiency measures to participants in the various utility affordability programs flows from a statutory mandate to operate the programs efficiently. New Jersey regulators have found that the state's rate affordability program will provide a steady stream of new participants into the energy efficiency program. Nevada requires that the agencies administering the rate affordability and energy efficiency components of the overall affordability programs develop a joint annual planning document explaining how the programs will operate together.

While part of a low-income affordability effort, not all low-income energy efficiency programs have the pursuit of affordability improvement as their primary objective. The California utility commission, for example, has explicitly held that the objective of that state's Low-Income Energy Efficiency (LIEE) program is to promote affordability. As a corollary of that objective, the California commission has emphasized that the goal in California is to expand the number of households served by the efficiency program rather than to expand the measures delivered in any given household. In contrast, the Pennsylvania Low-income Usage Reduction Program (LIURP) is viewed foremost as a usage reduction program. Efficiency investments through LIURP should be targeted to maximizing the cost-effective reduction of energy use. Targeting is toward high-use

customers, with the affordability impacts taken into account only among customers with equal consumption levels.

Finally, some states implement low-income usage reduction programs on equity principles. These states find that the broad scale demand side management programs adopted for residential customers generally do not reach low-income customers. New Jersey, for example, found that due to characteristics unique to the low-income population, unless special low-income usage reduction programs were implemented, these poverty-level households would end up paying for the efficiency programs without receiving any benefits from those programs. In these states, the low-income usage reduction programs are not designed to confer a special affordability benefit on the poverty population, but rather to ensure that the poverty population is not excluded from receiving benefits from these programs.

Administratively Linking Affordability and Efficiency

Most states operating a rate affordability program link their rate initiatives with their energy efficiency initiatives through a referral process. The automatic qualification of a high-use affordability participant for the receipt of energy efficiency measures, however, does not exist. Bill reductions through usage reduction and bill reductions through rate discounts/energy assistance are not found to be interchangeable. States such as Maine and Maryland refer high-use affordability program participants to their usage reduction programs, though such referrals do not have any "preference" in the receipt of efficiency services. Wisconsin requires high-use affordability program participants to accept efficiency services to the extent that such services are offered.

Cost Recovery

Some states incorporate the cost recovery of their low-income energy efficiency investments directly into the broader effort to address the unaffordability of home energy bills to low-income households. In Nevada, the legislation explicitly directs not only that efficiency measures be funded, but that a prescribed percentage of the low-income funding be devoted to low-income efficiency measures. Indiana's utilities, on the other hand, commit to an annual funding stream as part of their affordability efforts, but that commitment is individualized to each utility and is not part of a broader statewide program.

Affordability Program Design and Implementation

Our research has demonstrated that there are many different options for designing programs. For each program that we studied, policymakers in that jurisdiction chose to exercise their judgment on what combination of design elements is best suited to their program, their clients/customers, and their circumstances. All of the programs successfully enrolled customers, delivered benefits, and made energy bills more affordable for low-income households.

However, the various program design choices do affect the way that a program performs and how it affects both low-income customers and the utilities involved in the programs. Our analysis suggests that policymakers have important choices to make with respect to the key design elements.

- Program Funding

  - Program Funding Level – Policymakers must determine whether they will set a limit on program funding or attempt to serve all eligible customers with a fixed set of program benefits. While a program funding limit allows policymakers to project how the program will affect ratepayers, a fixed program benefit offers greater equity in treating all eligible customers in the same way.

  - Program Funding Source – A systems benefit charge (SBC) gives policymakers the greatest flexibility in terms of contracting for services and delivering benefits across utility service territories. However, since most utilities have included the costs of write-offs and collections activities in their existing base rates, some advocates suggest that funding programs through base rates is the most cost-effective approach for minimizing costs to ratepayers. Base rate recovery also ensures that program cost offsets are considered, whether implicitly or explicitly.

  - Targeting – Programs may be targeted at certain customers to address specific policy issues, or if the legal and/or regulatory framework requires it. In the absence of such requirements, program managers will need to conduct targeted outreach to certain groups (e.g., the elderly or households that speak a language other than English at home) if they hope to serve all customers who need the program.

- Program Benefits

  - Coordination with LIHEAP – Each state LIHEAP program delivers benefits to low-income ratepayers. Coordination with LIHEAP can help to reduce administrative expenses, improve the equity of programs at the state level, and can simplify program design.

  - Computation of Benefits – Programs have used percent-of-income calculations, rate discounts, and benefit matrixes to set program benefit levels. Each approach has certain advantages; it is important for policymakers to understand the trade-offs associated with these options to ensure that the program is meeting policy goals.

  - Level of Benefits – The benefits made available to clients in the programs we studied range from about $121 to $1,105 per year. It is clear that higher program benefits will have a greater impact on clients. However, the

available research also shows that all programs are viewed as important by clients and even relatively small benefit levels deliver some program benefits.

- Benefit Distribution – Benefit distribution procedures are extremely important. Whether benefits are provided as fixed payments, fixed credits, a monthly discount, or annual credits has a significant impact on client risks and responsibilities. They also appear to have some impact on program success rates. Policymakers must be careful to choose the payment distribution procedure that best meets their policy goals.

- Arrearage Forgiveness – Programs often attempt to resolve payment problems. Arrearage forgiveness is an important program element for those customers who enter a program with significant arrearages.

- Program Operations

  - Program Administration – Some programs are operated by State LIHEAP Offices and some are operated by individual utility companies. Utility companies often contract with local intake agencies for certain program services. There are advantages to each approach that must be considered in program design and implementation.

  - Program Certification and Recertification – Policymakers must consider trade-offs between program fiscal integrity and customer participation barriers in designing certification and recertification procedures.

  - Program Benefit Periods – When a program offers the customer a monthly benefit, it is important to consider whether receipt of the benefit will be contingent on consistent customer payments. While payment requirements may be an incentive for improved payment rates, they may be administratively complex and may result in many clients losing program benefits.

In the evaluation section, we examine how program design choices affect program outcomes. Some of the evaluation findings may help policymakers to select the program design options that best meet the objectives of their programs and the needs of clients in their jurisdictions.

Affordability Program Evaluations

The report reviews the results of affordability evaluations that have been conducted on programs that are researched in this study. The availability of evaluation information differed greatly by state and program.

One of the goals of the evaluation review was to assess whether the program performance indicators were related to the program design parameters. Because the program design parameters vary on so many dimensions, and because there are few evaluation reports

that contain a comprehensive set of performance statistics, the extent to which program design could be definitively linked to program performance was limited. However, where possible, we compare and contrast evaluation findings and relate the findings back to program design options, utilizing both the performance indicators summarized in this document and our experience studying the design and implementation of these programs.

Review of the evaluation reports is helpful because it sets realistic expectations for what may be achieved by implementing affordability programs and provides insight on how various program models perform. Some of the key findings from the review of the ten available affordability evaluations are summarized below.

Targeting

Despite funding of over $4.5 billion in Federal and ratepayer assistance, there are not enough funds to meet the low-income need for energy assistance. Therefore, targeting resources where they can provide the greatest benefit is critically important. A review of the evaluation reports showed that programs performed differently in terms of targeting key demographic groups. For example, the percent of households with income below the poverty level ranged from 49% in the NJ USF to 72% in PGW's CRP. The percent with elderly members ranged from 8% in PGW's CRP (where the elderly are more likely to participate in the senior discount instead) to 37% in the NJ USF. The characteristics of households who participate in the programs are predictably linked to the eligibility, outreach, and targeting approach that is employed. Therefore, program managers should think carefully about their target population when designing the program.

Retention and Recertification

In many affordability programs, customers are not removed from the program and continue to receive program benefits until their utility service is terminated. This practice leads to higher program retention rates than those programs that dismiss program participants who miss payments. However, programs still have difficultly recertifying customers or having customers reapply for the program. While recertification rates can be difficult to interpret, as some customers are not required to recertify when they participate in particular programs such as LIHEAP, reenrollment rates are more straightforward. The NJ USF evaluation showed that only 44% of customers reenrolled in the program. Since most customers continue to have need for assistance, programs can improve affordability by facilitating reapplication or recertification and by allowing customers to continue to participate in the program, even after they have paid off their full arrearage.

Affordability and Bill Payment

The affordability programs we reviewed resulted in large decreases in energy burden for program participants. Programs that targeted benefits to achieve particular energy burdens for clients came close to achieving these burdens on average.

However, programs appear to perform differently with respect to their impact on the consistency of bill payment. There are several theories for how bill payment assistance can affect customer payment behavior.

- *Annual Credits* - A lump sum payment, such as LIHEAP, may help the customer to pay off accumulated arrearages and prevent disconnection of service, or may assist the customer to keep current with the coming year's bills, depending on the individual customer's circumstances and the timing of the payment. By making the annual bill more affordable or by paying off the customer's accumulated debt, an annual lump sum assistance payment can improve payment patterns.

- *Rate Discounts or Fixed Credits* – These programs make the overall bill more affordable and thereby are expected to improve customer payment patterns. However, the program does not necessarily make payment requirements more consistent. In fact, some fixed credit programs result in no payment requirement in some months and a high payment requirement in other months.

- *Fixed Payment Plans* - Fixed payment plans require a customer to pay the same amount each month. It is argued that these plans have a greater likelihood of improving payment patterns because they help customers to develop regular payment patterns and increase the total amount of payments that customers make.

The evidence from the review of program evaluations included in this study is that only the equal monthly payment plans improve customer payment patterns. The one program reviewed in this study, the PGW CRP, that had an equal payment plan, is the only one that found improvements in the number of payments made by customers and the amount of cash payments made. Results from two other evaluations (of programs not included in this study) of low-income affordability programs with equal monthly payment plans also found improved payment patterns.

Arrearages

The evaluations found that a significant share of program participants did not pay their full reduced bill after enrolling in the programs. Because many customers come into the program with arrears and some do not meet their full bill payment obligations after enrolling in the affordability programs, arrears would continue to grow on average if arrearage forgiveness was not provided. Program evaluations showed that significant percentages of program participants received arrearage forgiveness, and the amount ranged from $182 to $403.

Financial Impact

Evaluations of the affordability programs found reductions in the number of collections actions and in the number of service terminations after customers began participating in the programs. There were also small reductions in collections costs, averaging $8 to $16

per customer. Such reductions can help to offset the administrative costs of these programs.

However, the evaluations are generally not able to assess whether programs are cost neutral. To measure cost neutrality, a program would have to measure the net cost of services for customers prior to enrollment (cost minus payments) compared to the net costs after program enrollment. Further, the analysis would require an experimental design where customers in similar situations were randomly assigned to test and control groups. Utility cost of service information is generally inadequate to measure true service delivery costs. Additionally, programs that we have researched have not employed an experimental design. Therefore, we have not found any evidence to either support or refute the hypothesis that programs can be cost neutral. However, based on their design, certain programs are unlikely to be cost neutral. Programs that result in large reductions in payments by customers are unlikely to be cost neutral.

Energy Usage

Energy affordability programs reduce the cost of using energy, and therefore program managers are often concerned that they may result in increased energy usage. However, evaluation results show that this does not occur. Program evaluations find small and insignificant increases in energy usage, or sometimes even find declines in energy usage.

The review of energy affordability program evaluations reinforced the perception that program design is critically important. Many program outcomes can be predicted based on the design parameters that are chosen. Program designers should think carefully about their goals and choose the program design parameters that are most likely to meet these goals.

Energy Efficiency Program Design and Implementation

While energy efficiency programs are often mandated through a public utility commission or state legislation, most aspects of program design and delivery are selected by the program administrator. Program design choices have important implications for targeting, energy savings, and cost effectiveness. In this study, we collected information on 13 different low-income energy efficiency programs. These programs are designed to account for local needs and to complement other existing low-income energy efficiency and energy affordability programs. In this section, we identify the dimensions on which program design choices must be made, discuss the advantages and disadvantages of each design choice, and identify the design choices made for the 13 energy efficiency programs that we reviewed.

Funding and Delivery

The largest ratepayer-funded energy efficiency program is the California LIEE. It was funded at over $130 million in 2006 and delivered services to over 160,000 low-income electric and gas customers. Many of the 13 states in our study have made a significant

investment of energy efficiency services. In addition to California, five other states spent more than $10 million per year.

Some programs set goals or restrictions on the number of households to be served or the average level of spending per home served. Per-home spending limits are sometimes set to ensure that resources are distributed across households and that no one household receives too large of a program benefit. However, by setting such limits, programs lose some flexibility to serve households with greater needs. Three of the programs studied had spending limits, ranging from $3,000 to $5,000.

Eligibility and Targeting

Common program eligibility parameters are poverty level, participation in affordability programs, and energy usage. Program specifications for poverty level range from 150 percent, the most common standard, to 225 percent. Programs sometimes require that households participate in the corresponding energy affordability program with the goal of reducing the subsidy that ratepayers provide. Four of the 13 programs studied included this restriction. Programs that serve higher usage households usually achieve higher energy savings. Two of the 13 programs studied set energy usage requirements for program participation.

Beyond setting eligibility limits, programs sometimes try to target certain households for service delivery. The most commonly targeted group in the programs studied was high energy usage households. Other targeted groups included those who have arrearages or who are payment troubled; households with elderly or disabled members or with young children; and affordability program participants.

Benefits

Energy efficiency programs vary widely in the type of benefits provided. The programs with lower funding levels, those serving lower usage households, or those providing baseload usage services only spend less per home and have a smaller variety of eligible measures. The most comprehensive programs spend several thousand dollars per home on average and include health and safety repairs and furnace replacement, as well as the more common weatherization measures. Expenditures per home range from $480 for the Maine Low-Income Appliance Replacement Program, which focuses on refrigerators and CFLs, to over $6,000 per home for the Wisconsin Weatherization Assistance Program.

All of the programs studied provide energy education as a part of service delivery. However, the level of energy education that is provided can vary widely by program. Often programs develop detailed energy education procedures, but without adequate training and reinforcement these procedures are unlikely to be implemented according to the protocols. Some of the programs also provide energy education that is separate from service delivery, either as a workshop or an additional follow-up visit. Follow-up to the initial energy education can provide reinforcement for the client and increase the energy savings from the program.

Program Operations

There are many operational aspects of energy efficiency programs that can be delegated to various program actors. These include the program manager, the service delivery contractors, the data manager, and the quality control team. State offices or utilities usually serve as program managers. Community Action Agencies, other nonprofits, for-profit contractors, or a mixture of these types are used to provide program services. Data management is often handled by the state or the utility, and is sometimes done by the contractor(s). Programs often use a mixture of quality control methods, conducting it both by the same contractors that serve the customers, and by the state or utility that oversees the program.

Other operational parameters to be decided upon include the service delivery procedures, the data management systems, and the quality control procedures.

Energy Efficiency Program Evaluation

This section reviews the results of energy efficiency evaluations that have been conducted on the programs that are researched in this study. The availability of energy efficiency program evaluation information differed greatly by state and program. Where possible, we compare and contrast evaluation findings and relate the findings back to program design options.

Targeting

Targeting of energy efficiency programs will vary by the program mandate, goals, and scope. Some programs explicitly target subgroups of the low-income population and some programs tend to serve particular subgroups due to the program design.

One of the most consistent findings from energy efficiency program evaluations is that customers with higher usage provide greater opportunities for savings, and therefore programs that target high usage yield higher savings and more cost-effective service delivery. A rule-of-thumb that is often used is that electric customers should have annual baseload usage that is at least 6,000 to 8,000 kWh, and heating and/or cooling usage of at least 8,000 kWh. Gas usage that is targeted for service delivery is often 1,200 ccf.

Most of the programs studied serve customers with average usage that exceeds these targets. One of the best targeted programs, the Ohio Electric Partnership Program (EPP), serves electric customers with average baseload usage of 13,500 annual kWh for the high-use program, 6,500 annual kWh for the moderate use program, and nearly 30,000 annual kWh for the Targeted Energy Efficiency (TEE) program which provides shell as well as baseload measures.

Cost-effective measure installation opportunities are a function of the usage level of the customers treated by the program. The Ohio EPP averaged over 16 bulbs per home for the high-use baseload program, over 12 for the moderate use baseload program, and

nearly 16 per home for the TEE program. This program also found frequent opportunities for refrigerator and freezer replacement.

Comfort and Health Impacts

Evaluations of energy efficiency programs often include surveys with program participants because this activity provides information that cannot be obtained from other evaluation activities. The evaluation review found that many of the customers surveyed noted that the winter and/or summer comfort of their home had improved since receipt of program services. In addition, one program evaluation directly measured a reduction in unsafe heating practices.

Usage Impacts

One of the primary issues addressed by energy efficiency program evaluations is the amount of energy saved by the program. When analyzing the change in energy usage that is due to the program intervention, it is important to look at weather-normalized energy usage and to make use of a comparison group.

Gross electric savings range from 366 to 3,461 kWh and from 4.7 to 12.5 percent of pre-program usage. Gross gas savings range from 8 therms to 156 therms and from two percent of pre-treatment usage to nearly 16 percent of pre-treatment usage. There is a strong relationship between pre-program usage and the amount of energy saved.

Cost Effectiveness

The cost-effectiveness of an energy efficiency program is the extent to which the program results in savings that cover the cost of providing the energy efficiency services.

Cost-effectiveness can be examined narrowly from the perspective of only the savings in energy usage, or more broadly in terms of both energy impacts and non-energy impacts. Non-energy impacts that are considered sometimes include increases in economic activity that result from the program, reductions in environmental pollutants due to decreases in energy usage, and improvements in participants' health and safety. These non-energy benefits are beyond the scope of this study, which focuses on the reductions in energy costs that accrue to program participants and/or to ratepayers.

Cost effectiveness can be measured in several different ways.

- The Savings to Investment Ratio (SIR) is the ratio of the amount of savings that results from the program to the costs that were incurred in providing program services. An SIR of one or greater indicates that the program yields at least one dollar of savings for each dollar spent on program services.

- The cost per unit saved is the amount of resources that are devoted for each unit of energy that is saved as a result of the program services over the measures'

lifetime. The program is often evaluated as cost-effective if the cost per unit saved is less than or equal to the current or expected future retail price of gas or electricity.

Most of the programs studied would be viewed as cost effective. The Ohio high-use and TEE programs and the PGW CWP have SIRs that are above one. Most of the electric and gas costs per unit saved for the other studies are below the retail cost of electricity and gas.

Bill and Payment Impacts

One of the goals of energy efficiency programs is to make energy more affordable for low-income households through reduced energy usage, and result in improved bill payment compliance. Most but not all of the programs studied resulted in gross and/or net reductions in the participants' average energy bills. The NJ Comfort Partners program reduced combination customers' bills by $234 on average as compared to the comparison group, the Ohio EPP reduced bills by $160, and the PGW CWP reduced bills by $64 as compared to the comparison group.

If customers come close to covering their bill prior to receiving energy efficiency services, the approximately ten percent reduction in energy usage may be enough to help customers meet their bill payment obligations, in the absence of rising fuel prices. Some programs had increased bill coverage rates, but in general significant improvements were not seen.

Findings and Recommendations

The purpose of this study is to furnish comprehensive information on low-income energy programs, including analysis of the energy needs of low-income households, the legal and regulatory framework supporting these programs, the design options for these programs, and the evaluation findings on program effectiveness.

- Needs Assessment – Our study found that the energy needs of low-income households are so large that it might be overwhelming for policymakers to consider options for resolving these problems. However, programs are not designed to serve 100% of low-income need and should not be expected to do so. Through careful research and analysis, it is possible for policymakers to identify the households in the greatest need and to design programs that are targeted to directly address those needs.

- Legal/Regulatory – Each of the 13 states that we studied used a different legislative and/or regulatory mechanism to authorize ratepayer-funded low-income program(s). The examples furnished by the 13 states give policymakers a good understanding of options for program authorization. They also demonstrate that authorization of low-income affordability programs is possible even in those

jurisdictions where legislation and/or legal decisions do not favor "preferential" rates.

- Affordability Program Design and Evaluation – Our research on the design, implementation, and evaluation of ratepayer-funded affordability programs demonstrates the importance of targeting the program design to the energy needs of low-income customers and policy goals. A careful review of how program designs affect customer incentives, as well as the impact of program designs on utilities and other ratepayers, will help to ensure that the program addresses the highest priority customers, the most important program objectives, and the most pressing policy goals. In addition, review of evaluation findings from other studies will help to establish realistic expectations for program outcomes.

- Energy Efficiency Design and Evaluation – Our research on the design, implementation, and evaluation of ratepayer-funded energy efficiency programs demonstrates the importance of matching the energy efficiency program design to policy goals. The research on program impacts and cost-effectiveness clearly demonstrate the best strategies to meet certain goals. Certain types of energy efficiency programs deliver modest benefits to large numbers of low-income customers, while others deliver significant benefits to the highest usage customers. Establishing the policy priority and a design to address that priority will yield the most cost-effective programs for ratepayers.

This report is designed to furnish each individual and organization with the type of information that is most needed at the level that is most useful. The body of the report furnishes an overview of all states and programs in the study, while the appendices furnish detailed information on each state and its programs. As policymakers consider the issues associated with the authorization, design, implementation, and evaluation of ratepayer-funded low-income energy programs, different parts of the report will be relevant.

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