Performance Contracting for Low Income Conservation

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Because of the societal need to assist low income residences, cost-effectiveness has not been a requirement for utility low income weatherization programs. However, a disregard for cost-effectiveness among utility low income programs short-changes both the low income and the subsidizing ratepayers.

Poor cost-effectiveness means that fewer kilowatt hours are saved per dollar spent. Were the investments more cost-effective, low income households would receive more conservation and lower utility bills per ratepayer dollar spent. With the growing concern for rate impacts and competitiveness, it is increasingly vital that all DSM budgets be as effective as possible, including those for low income weatherization.

Several utilities are testing the concept of using performance contracting to assure greater cost-effectiveness' and savings accountability. Two Oregon utilities are paying low income contractors on the basis of measured savings (their savings "performance") at a rate below the utility's avoided costs. Utilities in New York, Massachusetts and Texas have also accepted bids to treat low income residences, while utilities in California, Washington and Texas are evaluating such low income performance proposals.

The first of the Oregon low income programs has now treated over two thousand low income residences during its first eighteen months and has collected sufficient information to allow a good evaluation. In particular the utility's procedures (a) to assure cost-effectiveness through performance payments, (b) to promote high quality through long term measurement and continued inspections, (c) to encourage high customer satisfaction through repeated surveys and bonuses, and (d) to assure comprehensiveness and avoid cream-skimming through a unique "tiered pricing" system are reviewed, along with the actual results to date.

Introduction

Cost-Effectiveness Important for Low Income Weatherization

Utilities have long recognized a special obligation to provide conservation programs, especially weatherization assistance, for low income residences. The purpose is to alleviate the burden of high energy bills among a group that can least afford them and to improve the energy efficiency of low income housing. Although ratepayers have been asked to bear these costs, society as a whole appears to have long since accepted this burden as money well spent.

Over the past few years, a number of measurement studies have shown that many such low income programs are far from cost-effective. Table 1 lists the benefit cost ratios for several large and experienced weatherization programs which have recently completed measurement programs. The benefit-cost ratios, which are the utility's avoided costs divided by the total cost of the program, range from 0.50 to 0.86, according to filings made with the respective state utility commissions. However, these ratios may still be overstated since they do not account for any savings deterioration. In evaluations of Bonneville Power's weatherization efforts, Oak Ridge National Laboratory found very significant savings deterioration in the three years following installation (Brown and White 1992).

Considering the experience, size and long term commitment of these utilities to quality low income programs, it is unlikely that these values are unusual for low income weatherization programs nationwide.

Unfortunately, the people who are most harmed by this poor cost-effectiveness are the low income customers themselves. Given the reasonable assumption that the typical utility has a limit on the dollars it will spend on

Table 1. Benefit-Cost Ratios for Low-Income Weatherization Programs

Utility	B/C Ratio
Southern Cal. Edison	0.50
Central Maine Power	0.57
San Diego Gas & Elect.	0.60
Southern Cal. Gas Co.	0.86

Sources: CMP 1993; Advice Letters of California Utilities to California PUC, 1994

low income weatherization, the only way to increase the benefits received is to improve the cost-effectiveness of the dollars spent.

For example, assume a weatherization program with a benefit-cost ratio of 0.60 reduces low income customers' retail energy bills by $100,000 annually for each $1 million spent. (This is the result if a program saves 1.2 million kwh annually per million dollars spent; and, the utility has a present value avoided cost stream of $0.50 per first year kwh saved and a retail rate of 8.3 cents per kwh.)

Such a program can increase benefits to the low income customers by 50% *either* by increasing the budget by half (from $1.0 to $1.5 million) or by improving the cost-effectiveness ratio by a half, from 0.60 to 0.90. Even better would be to increase it high enough to make it fully cost-effective. For example, bringing the same program to a cost-effectiveness level of 1.20 would double the benefits to the low income customers—without a single dime increase in ratepayer subsidies. This money from increased utility bill savings will become additional disposable income for the customer, helping the customer's household and the local community.

Doubling the cost-effectiveness is feasible. For example, the prime difficulty with the California low income weatherization programs is the poor "realization ratios". The realization ratio (which is also referred to as a performance ratio) is the percentage of projected savings, usually based upon the savings potential of the measures installed, which are actually realized as measured savings, i.e., the performance of the measures installed. The average California utility program had a performance or realization ratio of 53%, with some as low as 28% sens (Brown 1994).

Improving the cost-effectiveness of the program has major "up-side" impacts by increasing the benefits delivered to low income households and reducing the costs of conservation resources purchased by the utility. It will also help protect against the "down-side" risk of reduced ratepayer funding. Today's new buzz-words are competitiveness and rate impacts. What is the future of low income weatherization support in this environment, especially if it is not cost-effective? Ignoring the issue of cost-effectiveness may quickly undermine the support of the ratepayer population for low income weatherization-especially if ratepayers believe it costs more than it is worth.

Looking for a Solution

Many utilities and low income advocates are recognizing the problems inherent in poor cost-effectiveness in such programs and are looking for solutions. However, there is a serious concern that the very significant positive aspects of existing weatherization efforts not be lost. For example, these programs are typically more comprehensive than other residential programs which depend at least partially upon customer contributions.

There is also a recognition that there may be short term barriers or disincentives to improving cost-effectiveness. One is a natural reluctance to upset any long-standing procedures or policies when involved with such a sensitive and politically charged issue. Others are financial. For example, many shareholder incentives for low income weatherization are based, not on benefits delivered or cost-effectiveness, but on dollars spent. At least as important is a very real concern that any revisions not make the situation worse for the low income households.

Several utilities are evaluating the use of residential performance contractors to improve the overall performance and cost-effectiveness of their low income programs. A performance contractor, also known as an energy service company or ESCO, is paid based upon its "performance" in saving energy, usually on a cents per kilowatt hour or therm saved. In effect, the contractor sells the conserved energy back to the utility at a set price per kwh or therm, usually set below the utility's long term avoided costs. Since the utility pays per unit of energy saved and only if there are measured savings and since the price per unit of energy is set (normally) below avoided costs, the program is always cost-effective, regardless of the number of participants or the savings actually realized.

When given the opportunity, performance contractors have responded with cost-effective proposals to treat low income residences, both single family and multi-family. Table 2 shows a number of utilities which have received low income performance proposals and the benefit-cost ratio for each bid. There have been several other low income proposals, but we do not have access to the prices or cost-benefit ratios. Unless otherwise marked, all of these proposals are from a single performance contractor. They are in approximate chronological order.

Table 2. Low Income Performance Bids Cost-Benefit Ratios

Utility	B/C Bid
Northeast Utilities*	1.56
Commonwealth Edison*	1.20
Niagara Mohawk (SyrESCO)	1.63
Portland Gen. Elec.	1.49
Central Maine Power	1.18
Pacific G&E (Citizens)	1.81
PacifiCorp	1.61
Texas Utilities**	0.93
City of Austin	1.12
Houston L&P	1.17
Pacific Gas & Elec.	1.25
Snohomish PUD	1.56

* Not exclusively low income.
** According to TU calculation.

Sources for the information on Northeast Utilities, Commonwealth Edison, Niagara Mohawk, Central Maine Power, Pacific Gas & Electric, and Texas Utilities is taken from publicly available documents filed by each with their respective utility commissions. The data on all others was provided by private communications with Richard M. Esteves of SESCO, Inc., which submitted the other proposals listed.

The Low Income in Performance Conservation History

Until SyrESCO's ground-breaking proposal to Niagara Mohawk Power Corporation in 1990, there had been no performance bids devoted exclusively to low income programs. However, low income and similar groups have been a part of the residential performance bidding efforts from the very earliest efforts.

The nation's first residential performance contracts, for the 1980-81 Residential Energy Efficiency Projects featured work in senior citizen communities in southern New Jersey. The success of these efforts led directly to the expansion of those programs to the Residential Energy Conservation Action Programs (RECAP) of 1983-1985 which treated thousands of residences in New Jersey and Pennsylvania under performance contracts.

The 1985-1987 Springfield (MA) Project, sponsored by Northeast Utilities, demonstrated that low income customers were an excellent prospect for performance contractors. Although not required to treat any low income, 24% of the performance contractor's residences were low income, more than twice the proportion of low income in the population. An evaluation of this phenomenon pointed out that while low income customers often used less energy, they showed much greater cost-effective conservation potential (Esteves and Jacobs 1987). This encouraged the performance contractor to make extra efforts to pursue this hard-to-reach category.

This Northeast Utilities program also saw the first successful bid by a non-profit performance contractor, as Boston's Citizens Conservation Corporation successfully bid and treated master metered apartment complexes, both regular and low income. In the 1990's, Citizens has successfully bid for low income and subsidized housing in a number of other performance bidding programs, including Pacific Gas & Electric (CA) and Commonwealth Electric (MA).

The interest of energy service companies or ESCOs to treat low income customers was further confirmed in the 1987-1988 Residential Energy Efficiency Program, sponsored by Commonwealth Edison. To assure that the low income were not ignored, that utility required bidders to commit that at least 20% of the treated residences would be low income, approximately the portion in the target market of multi-family residences. The performance contractor secured a penetration of 40.4% low income, again citing the proportionately greater potential for cost-effective conservation among the low income group (Esteves 1988).

In 1990, the nation's first successful bid to specifically treat low income facilities was made by Syracuse-based SyrESCO in an all-source bidding program sponsored by Niagara Mohawk. SyrESCO, a not-for-profit corporation involved in low income and non-profit conservation efforts, bid to treat a number of low income and

subsidized public housing apartment complexes in its home area in 1991-1993. Building on its local success, SyrESCO later placed successful bids with New York State Electric and Gas (NYSEG) and most recently with Commonwealth Electric in Massachusetts.

In 1991, Central Maine Power signed a general residential performance contract which allowed it to refer low income and other special customers to the performance contractor for treatment. The following year, after a full evaluation showed their in-house weatherization programs to be twice as costly as the performance contract, CMP suspended its low income program and referred all eligible low income customers to the performance contractor for treatment.

In 1992, Portland General Electric (OR) issued the nation's first performance conservation bid program targeted expressly toward low income customers, asking for bids on five thousand residences. In a process copied by others, PGE emphasized that this pilot effort was meant to be cost-effective and that it would be run in addition to its standard low income weatherization efforts. Later that year, Pacific Power & Light (OR) issued a similar proposal for another five thousand low income customers. Both programs are now well underway, PGE using SESCO, Inc. of New Jersey and PP&L using Seattle-based ECONS Corporation.

A temporary set-back to the concept of low income performance contracting occurred in 1992-1993 when California utilities specifically eliminated low income customers from participation in a series of competitive DSM performance bids conducted there. However, performance contractors are now seeking permission to bid in the low income weatherization efforts, based upon their promise to deliver savings to low income residences more cost-effectively than the utility's programs. Recent studies have shown the cost-effectiveness of such programs to be as low as 0.50 (a 1.00 is needed to reach minimum cost-effectiveness). However, in 1994, one experienced performance bidder offered a program at a guaranteed Benefit-Cost ratio of 1.25—but the bid was rejected because the utility had mandated that bidders must attend the pre-bid conference, which the performance contractor had not been notified of and had, consequently, not attended.

In 1993, the Washington State Association of Community Action Agencies conducted the nation's first statewide training conference to help low income agencies to bid in that state's mandated DSM bidding programs. That conference, assisted by representatives from residential ESCOs, has led to serious negotiations between private performance contractors and public non-profit weatherization agencies on conducting joint bid projects. If successful, this could form a pattern that would draw on the strengths of both groups in treating low income residences.

In 1993, Texas Utilities ("TU Electric") was the first utility to make special provisions for low income customers in its all-source bidding effort. While welcoming all types of bids, it developed a "clustering" system in which bids for similar groups of customers would be compared against each other. In particular, TU Electric specifically identified a residential low income "cluster" and invited ESCOs to submit proposals to satisfy this subgroup. In 1994, TU Electric received low income proposals from at least four different bidders which offered to collectively treat over 30,000 low income residences.

In 1994, Houston Lighting & Power and Austin (TX) Municipal Utility have sought and received similar low income "cluster" bids as part of their overall DSM bidding efforts. And in California, the PUC has now required that at least 25% of Southern California Gas Company's low income weatherization effort be put out to bid (although it is not yet clear if the utility will be allowed to exclude performance bidding).

The PGE Performance Program

The low income performance project most applicable to other programs nationally is probably that sponsored by Portland General Electric Company ("PGE"). PGE provides electric service to over 600,000 customers in northern Oregon and has a strong history of pursuing cost-effective DSM. It has long supported low income weatherization programs and has one of the most active programs in the nation.

Project Background and Overview

In July 1992, PGE accepted bid proposals to treat up to 5,000 single and/or multi-family low income residences on a performance basis. This was the nation's first exclusively low income performance bidding effort, the nation's first to use a "tiered pricing system" to prevent cream-skimming, and the first residential performance contract in the Far West. In September 1992, PGE accepted one of the bids from SESCO, Inc., and the contract was negotiated and signed in December 1992.

The PGE project will treat five thousand single family electrically heated residences around Salem, Oregon by year-end 1995, saving a projected 12.5 million kilowatt hours annually, or about 2,500 kwh per house. The savings are measured at each house, based upon a comparison of the three years after treatment with the three years prior to treatment, using such adjustments as weather, a control group, and participation in other DSM programs. The contractor is to install insulation, weatherization

(infiltration reduction), water heating improvements and energy efficient lighting.

PGE is continuing its low income weatherization programs both outside and inside the performance program's target area, treating this effort as an additional enhancement and supplement to its normal program. There are provisions in the contracts to reduce overlap and to prevent "double counting" of the savings should any unintentional overlap occur.

In addition to the normal benefits of a performance based conservation program, the PGE project has used a number of innovative techniques to assure cost-effectiveness, comprehensiveness, top quality and high customer satisfaction.

Cost-Effectiveness Guaranteed

The prime benefit of a performance conservation programs is guaranteed cost-effectiveness. For the low income programs, performance contracting moves the performance risk from ratepayers to the contractor responsible for designing and implementing the work. As was seen in California, where the performance was about half (53%) of what was projected, this risk can be very significant. The price, usually on a cents per kwh or therm saved basis, is set below avoided costs and is subject to payment and full true-up after the savings are measured.

The PGE program price is calculated at 67% of avoided costs (a 1.49 benefit-cost ratio), assuming the Contractor's projected average annual savings of 2,500 kwh per house is realized. The lower the savings per house, the lower the unit price per kilowatt hour, down to 39% of avoided costs should savings be less than 1,200 kwh per house. Each kilowatt hour saved above 1,200 kwh tier is purchased at about 93% of avoided costs, setting the absolute maximum price for any kilowatt hour, measure or house. At 2,500 kwh, the mix comes out to 67% of avoided costs .

To reduce short term rate impacts, payments are spread over six years following each installation, or nine years for the entire program overall. To reduce unnecessary financing costs, PGE pays an "advance" of $450 per house upon completion and satisfactory inspection, to be subtracted from future payments, which begin 15 to 24 months later as annual savings are calculated. If the savings are not enough to recover the $450 plus interest, then the contractor must return any shortfall.

Since PGE pays only for measured savings results, there is no way for a contractor to "pad" payments by installing measures which are unnecessary or not cost-effective, nor is there any benefit for incorrectly claiming uninstalled measures were installed.

Assuring Comprehensive Installations

By its nature, performance contracting encourages comprehensive treatment. Once the contractor has already made the commitment of marketing, financing, maintenance, and verification at that residence, and since the cost of the audit, inspection and crew at the site are already covered, the cost of the incremental improvement becomes much less (often little more than the cost of the materials) than if each measure were priced and paid for separately. The PGE program has added two features which strongly buttress this natural tendency toward comprehensive treatment.

The PGE low income performance program has a maximum cap of 5,000 houses, but no cap on the total savings overall or at any one house. Since the contractor will be paid based upon the measured savings in a fixed number of houses, any cost-effective measure the contractor leaves undone in any residence is "money left on the table", which cannot be made up by completing additional houses. The cap on the number of treated low income residences prevents the contractor from trying to "make up" for cream-skimming by treating additional low income residences. Improving comprehensiveness is the contractor's only "winning" strategy under these circumstances.

However, the strongest influence is PGE contract's use of a "tiered pricing" system such that the first tier of kwh savings per house are provided at a very low price (39% of avoided costs). Any savings in excess of that tier are purchased at close to full avoided costs (93%). This assures that ratepayers receive their benefits first, that ratepayers pay little for "cream-skimming" measures, that all measures that are cost-effective up to the utility's avoided costs are installed, and that the contractor has the correct incentive price signal to maximize the cost-effective savings. Table 3 shows how payments per house are reduced for each 10% reduction in savings from the projected 2,500 kwh.

This tiered pricing system has now been adapted by PacifiCorp in its low income bidding and by San Diego Gas & Electric in its residential DSM bidding program. These two utilities have further refined the system by setting the first tier as a totally "free tier," with no payments due for the first "cream-skimming" block.

The performance contractor has responded to this emphasis on comprehensiveness by setting up and using an extensive hi-weekly employee bonus system to reward

Table 3. Tiered Pricing Impact Penalizes Cream-Skimming (PGE Example)

KWH Saved	Price Per KWH	Payment Per Hse
2,500*	100%	100%
2,250	96%	6%
2,000	90%	72%
1,750	83%	58%
1,500	74%	44%
1,250	61%	31%
1,000	58%	23%
750	58%	17

* Contractor's target savings and payment per house.

crew comprehensiveness. Based upon the first fifteen hundred houses completed, the hi-weekly comprehensiveness bonuses for the installation crews will exceed $210,000 over the three year project.

The bottom line is that the performance contractor has installation rates comparable to or higher than those of "standard" low income weatherization programs. A comparison of the performance contractor's installation rates to those of PGE's "standard" low income program and to the national average are shown in Table 4.

Performance Contracting Promotes High Quality

Because the performance contractor is paid strictly upon the measured savings, the performance program has a built-in incentive to provide top quality workmanship and materials that assure high, long-term savings. If the contractor uses below standard workmanship or materials, either the savings will not materialize and what does show up in the first year's savings will quickly deteriorate during subsequent measurements years.

In addition to this natural built-in incentive, the PGE contract requires that the measures installed meet or exceed the materials and installation specifications for similar measures in PGE's own low income programs. And PGE may inspect any treated home and withhold payment if it fails inspection and the problem is not immediately corrected.

However, performance conservation changes the significance of a utility's inspection process from a "police" effort to check up on the contractor to a mutual "partnership" effort to maximize savings. Under a performance program, the utility and the contractor have the identical goal: maximize energy savings that persist over time.

At PGE, the contractor maintains an independent in-house inspection function that visits treated houses to assure that quality and comprehensiveness have been achieved, since the lack of these directly penalizes the performance contractor. The inspection by the utility represents a fresh back-up pair of eyes to review the work or to hit houses missed by the contractor's in-house inspections. The performance contractor should welcome such assistance. The contractor would much prefer to find and quickly repair any problem during the installation period than to learn of it through poor savings after the first measurement year is completed.

Regardless of any prior inspections, the performance contractor has set up a "flagging" system to investigate and re-inspect any house whose measured savings are significantly below expectations. If there are corrections that need to be made, this allows the contractor the opportunity to recover at least some of the cost before the end of the measurement period and it assures PGE that the contractor has an ongoing interest that the measures installed do not deteriorate and are properly maintained.

The recognition that quality assurance is a "partnership" and an understanding of the importance of quality assurance to the performance contractor has led to a close working relationship between the utility's inspectors and the contractor's inspectors and crews. During the first year, they inspected about 90% of all treated residences, either jointly or separately. Although the number of PGE's inspections are now far fewer than in the first year, PGE or the Contractor is still inspecting about 75% of all houses. Inspection reports are shared back and forth, improved measures, materials and techniques are evaluated, tested and implemented, potential trouble spots or tendencies are quickly identified and remedial training provided, and any customer service issues are immediately shared and rectified.

To promote quality assurance, the contractor has set up a hi-weekly quality ranking system for all crews based upon the inspection ratings provided by both the in-house inspectors and by PGE's inspectors. Bonuses from a $60,000 quality bonus pool are paid out every two weeks to reward the highly rated quality installations. The top quality crew can earn an additional $4,000 annually per person from these quality bonuses. Most important, initial entry to the Contractor's management development program is limited to those crew chiefs who have earned the

Table 4. Comprehensiveness of Performance Contractor (ESCO) Comparable to PGE and National Averages

	ESCO	PGE	National
1. Infiltration Reduction			95%
a. Weatherstripping	97%	44%	--
b. Caulking	91%	53%	--
2. Insulation			
a. Attic	47%	49%	50+%
b. Floor/joist	27%	40%	10% to 20%
c. Wall	0%	15%	
d. Duct	24%	5%	1-2%
3. Compact Fluorescents	99%	0%	NA
4. Water heating			56%
a. Wraps	83%	NA	--
b. Pipe wrap	93%	19%	--
c. Showerhead	86%	NA	10%

Sources: "ESCO" data from 1993 monthly reports to PGE from SESCO, Inc.; PGE (Weijo 1991); National (Demand-Side Technology Report, May 1994)

Top Quality Ranking over an entire quarter. The Top Quality crew chief is immediately rotated out for a quarter to provide training and inspections for other crews and to participate in various training activities for herself or himself. To date, 100% of the Contractor's inspectors, field supervisors, and project directors nationwide have been taken from the ranks of these Top Quality crew chiefs.

It is difficult to secure an objective measure of quality assurance or a measure of the performance contractor's enlightened self-interest in quickly correcting any quality problems found. However, one indicator is that PGE has inspected well over a thousand houses to date and have not once had the need to withhold or delay payment because the work did not pass inspection prior to the payment due date.

Customer Satisfaction Vital

From the very start of the program both PGE and the performance contractor recognized that cost-effectiveness should not be at the expense of customer satisfaction. While a past record of high customer satisfaction was one of the evaluation points in selecting the contractor, PGE and the contractor went even further to assure high customer satisfaction was pursued by the contractor and by all of its personnel.

As part of the contract, PGE set aside a Customer Satisfaction bonus fund of $100,000, to be awarded based upon customer survey responses conducted at least annually. To assure high employee interest in the outcome, the contractor pledged to distribute the annual satisfaction bonus amounts earned among its employees. In addition, the contractor has set up a system of hi-weekly rankings for the crews based upon their in-house satisfaction surveys provided to each customer. In addition to the "friendly competition" and peer pressure this encourages, the contractor has provided an additional in-house bonus fund of $16,000 to be split by the top rated crews in customer satisfaction.

To closely and quickly track customer satisfaction, the performance contractor provides each customer with a postage paid mail survey to be returned to PGE, who

reviews and turns them over to the contractor for tracking and follow-up, if needed. These form the basis of the bi-weekly crew rankings and bonuses, while quickly identifying any trends or potential trouble spots.

The system has apparently worked. In January 1994, PGE, through Market Decisions Corporation, surveyed the first 1,200 customers treated in 1993 (Market Decisions 1994). Out of a theoretical perfect score of 100, the performance contractor scored a 93 in the five categories measured (overall satisfaction with work and program, professionalism and courtesy, information and explanations provided, neatness of site and work, and punctuality and timeliness). Of particular interest, 64% reported themselves as being even more satisfied at the time of the questioning than they were just after the work was done (compared to only 2% who reported they were less satisfied.)

Lessons Learned

The most important lesson learned to date is that performance contracting can be successfully applied to low income weatherization programs to assure cost-effective, quality programs. As part of that lesson, we have learned that there already exists a significant number of national and regional residential performance companies able and ready to compete for this market. And numerous local firms, given the opportunity, are willing to join the ranks of performance contractors. (For example, when Southern California Gas Company undertook its residential performance bidding pilot, it received proposals from twenty-eight different contractors, most of them from local first-time bidders.)

These early bids have also demonstrated some important aspects not considered as part of the earlier performance programs:

1. Use performance contracting as a supplement, not a replacement. There are many residences which may not lend themselves to the measurement procedures incorporated in a performance contract. And there may be some houses which need to be treated even if not cost-effective. It is important to maintain and nurture the existing infra-structure and help move it to greater cost-effectiveness than to destroy the ongoing relationships and experience that exist today.

2. Use a sliding payment scale to reflect savings life. A presumption of what the average measure life is supposed to be is hard to negotiate and even harder to assure. Several utilities now use a sliding scale for different average measure lives. This provides the performance contractor with the correct incentive to concentrate on the long-lived improvements and penalizes any installation that uses short-lived measures.

3. Financing barriers can be easily reduced. While there are a few national ESCOs able to secure large blocks of financing, most contractors can not secure outside financing, nor have the internal resources to support a performance program. However, reasonable cooperation can overcome this. Many quality contractors, comfortable with their ability to deliver cost-effective conservation, need only to temporarily cover all or part of their incremental costs. For example, the $450 from PGE or the offer by SoCalGas to pay for 40% of the projected savings upon inspection are very effective in encouraging participation and in driving down costs.

4. Multi-year measurement is important, but not to excess. One year measurement periods are not sufficient to check the measures under different conditions, nor to assure that the potentially heavy deterioration of the first few years have been taken into account. However, an excessive measurement term drives up the cost of the program. More important, the further away we are from the base period, the less reliable the measurement process becomes, especially if the pre-treatment period is limited to a single year. A three to five year period for the pre- and post-installation measurement appears a reasonable compromise. Also useful may be “tail block” payment streams in which the high payments are made in the first few years and a much lower rate is paid in the outlying years when the measurement is less reliable.

5. Residential contractors readily accept performance concept, once offered. While there is understandable concern over the potential disruptions of a performance program, most residential contractors would like to participate if they could. Currently, most utility sponsored programs are tightly specified and go to the qualified contractor with the lowest price. This has ratcheted down the prices and made it impossible to increase net revenues. However, a quality contractor who can deliver above average savings can increase its revenues through improved savings while avoiding the micro-management required in the standard cost plus, time and materials payment program.

6. ESCO-Agency partnerships may be an emerging development. Local weatherization agencies have the installation infra-structure, local identity and contacts, and the credibility and stability needed to treat and maintain hard-to-reach low income residences. Performance contractors bring measurement familiarity, financing capabilities, and a background in cost-effective project management.

Conclusion

There is unlikely to be a significant increase in funding for low income weatherization in the coming years. In fact, most indications are that all utility-funded conservation programs will come under increased scrutiny for rate impacts. While weatherization assistance enjoys the benefit of widespread support, it carries the burden of poor cost-effectiveness in most applications.

The only way to increase the benefits to low income households and to reduce the potential for cut-backs is to make the programs more cost-effective—by getting a greater "bang for the buck." One very effective method to do so is to use performance contracting for a portion of the utility's program. Performance contractors have demonstrated that they are willing and able to provide cost-effective conservation from the treatment of low income residences.

Most important, early performance programs are demonstrating that such programs can operate high quality, comprehensive programs that achieve high customer satisfaction. A continued expansion of such programs can provide significant additional benefits to low income customers without any increase in ratepayer costs.

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