Utility Multifamily DSM Programs and Public and Assisted Housing: Fitting Program Designs to Emerging Opportunities

Stephen Morgan, Citizens Conservation Corporation

The multifamily sector presents numerous barriers to market penetration by utility demand-side management (DSM) programs. Within the multifamily sector, public housing and publicly assisted are particularly hard to reach because of additional hurdles associated with HUD regulations. Although the potential for energy savings in these subsectors is enormous, they remain largely elusive to DSM program designers, despite recent changes to HUD regulations that remove disincentives to energy efficiency improvements in public housing. However, an innovative program design that includes attractive incentives to buildings owners and public housing authorities (PHAs), coupled with aggressive marketing, can facilitate penetration into these market niches.

This paper discusses elements of program design that enable utilities to tap into the high energy savings potential in public and assisted housing. To successfully address public housing, utility DSM programs must be poised to take advantage of the opportunities presented by the new HUD regulation that alters the Performance Funding System (PFS) (the mechanism by which HUD reimburses public housing authorities for utility expenses). Such programs should have two or more of the following attributes: (1) a cost-sharing allowance, enabling PHAs to pay for that portion of a measure that exceeds the utility's avoided-cost ceiling; (2) a resident education, performance monitoring, and/or maintenance staff training component; (3) a subsidized financing provision; and (4) a diagnostic survey or energy audit that qualifies eligible measures according to building-specific data.

Five case studies illustrating different approaches to targeting the public and assisted housing markets are presented.

Introduction

Utility DSM programs for multifamily buildings face many unique barriers: split landlord and tenant incentives; high resident turnover; poorly trained maintenance staffs; and inadequate access to financing for cost-shared measures. Additional hurdles exist in public and publicly assisted housing. In public housing, barriers have traditionally included: contractors unwilling to enter crime-ridden developments; strained relations between residents and management staff; and myriad HUD requirements governing design and installation of capital improvements. Until late in 1991, HUD requirements prevented public housing authorities (PHAs) from keeping any significant savings derived from energy efficiency improvements financed by debt or by third-party investors. In HUD Section 8, Sections 221(d)(3) and 236 housing, and in state-assisted housing, building managers require regulatory approval before making debt-supported investments in their buildings. HUD-assisted buildings, for example, typically require separate competitive solicitations for design and engineering services on one hand, and construction management and measures installation on the other. Owners planning energy efficiency investments financed by loans cannot win approval without a lengthy and often burdensome review by HUD financial and construction analysts in area and regional offices. State- and city-financed buildings face a similar process of regulatory review.

The 1991 HUD Regulation: The Removal of a Barrier to Efficiency in Public Housing

In September 1991, new HUD regulations changed the way HUD reimburses PHAs for energy and water expenses. Before the regulatory change was implemented, any reduction in energy or water use through conservation simply meant a reduced operating subsidy from HUD, and PHAs had no incentive to invest in energy efficiency. The new regulations, which comprise the Performance

Funding System (PFS), removed this barrier by allowing PHAs to retain a portion of the savings generated by energy efficiency measures installed under an energy performance contract.

Utilities can take advantage of this incentive by structuring DSM programs so that the contractor ESCO may enter into a performance contract with the PHA. Electric or gas utilities with cost-sharing requirements for some or all of their eligible DSM measures can structure their programs to facilitate PHA participation. Some electric utilities, including Boston Edison Company and Connecticut Light & Power Company, have already done so. Public Service Electric & Gas Company of New Jersey (PSE&G) and Bay State Gas Company in Massachusetts have designed programs attractive both to PHAs and other publicly assisted multifamily buildings.

The new regulation associated with HUD's Performance Funding System encourages PHAs to utilize performance contracting or debt financing to capitalize energy efficiency investments. Undertaken in conjunction with utility program subsidies and/or a HUD grant program for modernization improvements, these debt-financed improvements can be repaid from energy savings over a period of up to twelve years. Under the terms of the Performance Funding System (PFS), HUD will reimburse any PHA that undertakes energy efficiency improvements with debt financing. The PFS is the fuel payment formula utilized by HUD for reimbursing local PHAs.

HUD regional offices must approve PHA plans to incur debt or enter into performance contracts with energy service companies to finance and install measures. Since HUD will be paying the bills over the term of such contracts, the Department will be concerned that steps are taken to assure the persistence of savings: annual resident education, maintenance staff training, and performance monitoring are program components HUD will look for in a utility DSM program or a stand-alone contract with an ESCO.

One important issue for both utilities and public housing authorities to consider regarding energy performance contracting is the timing of the performance contract and the utility-provided incentives. If a public housing authority is considering going out to bid under the 1991 HUD regulations, it is crucial that any utility-provided demand-side incentives (such as lighting) **be linked with the performance contract rather than offered prior to the contract.** Because of the methodology used by HUD in determining the energy savings and utility reimbursements, the PHA may not be able to recoup the energy savings from any utility demand-side measures that might be installed prior to the implementation of an energy performance contract. Therefore, the overall linkage and timing of utility programs with PHA energy performance contracts are essential to the PHA's ability to retain the savings generated by the DSM measures.

Utility Program Design Components: Penetrating the Public and Assisted Housing Markets

Public Housing

Because a utility can address thousands of units of low-income, multifamily housing by dealing with a handful of decision-makers, PHAs should provide an attractive market for DSM. Public housing developments are typically inefficient users of gas and electricity: a 1993 DOE study concluded that public housing uses about 12% more energy per household than the overall category of large multifamily buildings (DOE 1993). Hence, the benefit/cost ratio for DSM programs covering PHAs should be high. Now that PHAs have a positive incentive to borrow money or contract with ESCOs to install needed efficiency measures, utilities can design programs which may include cost-share provisions for appropriate program measures.

Utility demand-side management (DSM) programs poised to take advantage of the peculiar opportunities of the Performance Funding System (PFS) have two or more of the following attributes:

(1) a cost-sharing allowance, enabling PHAs to pay for that portion of a measure that exceeds the utility's avoided-cost ceiling;

(2) a resident education, performance monitoring, and/or maintenance staff training component, all elements which address persistence of savings;

(3) a subsidized financing provision, allowing PHAs to access debt to pay for eligible measures;

(4) a diagnostic survey or energy audit that qualifies eligible measures according to building-specific data, rather than a list of prescribed measures for which all buildings are eligible.

Assisted Housing

One particular program design, the standard offer contract offered by Public Service Electric & Gas Company of New Jersey (PSE&G), is an attractive option for all categories of publicly assisted buildings. It stipulates the payment schedule for therms and kilowatt-hours saved under energy efficiency investments secured by the host buildings, usually in conjunction with an energy services company. While the utility does not offer subsidized

financing, it does offer to purchase the savings generated by outside financing. That offer should be sufficient to convince private investors that multifamily housing with attractive efficiency opportunities is a good investment.

Because the PSE&G program will pay for therms and kilowatt-hours saved for 5, 10, or 15 years, it provides an incentive for resident education, maintenance staff training and other actions designed to facilitate the persistence of savings. Unlike demand-side bidding programs, the standard offer contract does not pit office buildings, factories, hospitals and their respective efficiency opportunities against multifamily buildings. As long as the total therm and kWh savings goals are high enough, qualified bidders in all sectors can participate.

These programs also have distinct advantages to utilities and their ratepayers, especially in contrast to the direct investment or grant programs typically offered today:

(1) they leverage customer contributions to pay for measures which secure DSM savings;

(2) they address the persistence of savings, the basis for utility incentives from public service commissions;

(3) they lengthen the list of measures that can be installed, maximizing the potential savings per customer served;

(4) many, but not all, amortize the DSM investment, reducing the rate shock effect.

The Typical Multifamily DSM Program Design

Most utility DSM programs that address the multifamily sector provide either grants or rebates. Grants are often provided for low-cost, quick payback measures such as fluorescent lighting, while rebates are typically offered for appliances. These programs generally have relatively low market penetration rates and low levels of energy savings, resulting in lost opportunities and a large portion of non-participants. Some programs have offered multifamily building owners market-rate loans, which attract little response.

Interviews with two utilities revealed a not uncommon pattern among DSM program managers in dealing with PHAs [1]. In each case, grant funds offered by the utility were turned down by the PHAs. The reasons for such a seemingly inexplicable response are twofold. First, any savings generated by the measures would simply mean reduced payments from HUD to cover utility costs, and the PHA would retain no savings. The PHA may retain savings only if measures are installed under the Performance Funding System via a loan. The second reason for the lack of interest in grant programs is the "hassle factor." With no financial incentive to participate in the grant program, the PHAs often try to avoid what are often perceived as the headaches involved in measure installations, such as disturbing residents and maintaining the new measures, with which the maintenance staff might not be familiar.

Grants or rebates are not necessarily inappropriate *per se* for multifamily programs. But if included in programs intended to target public and/or assisted housing, they should be combined with other specific elements that improve market penetration. Programs should be flexible enough to accommodate performance contracting, offer below-market rate financing, and/or allow for an owner or PHA cost-share, which enables a more comprehensive package of measures. For targeting assisted housing, grants may also be appropriate as part of a standard offer contract, as in the case of PSE&G, where the ESCO directly installs utility-funded measures.

Case Studies of Programs that Successfully Target the Public and Assisted Housing Sectors

The following five utility programs illustrate a variety of program designs that address the market niches occupied by public housing, assisted housing, or both. One of these is a gas utility; two are electric; two are combined gas and electric utilities.

Niagara Mohawk Multifamily Program

The Niagara Mohawk program combines some of the features of direct investment and performance contracting. The program addresses electrically heated buildings with five or more units. The company contractor performs an audit which determines which measures pass the avoided costs screen. Hot water, controls, envelope, and lighting measures are considered. The utility approves and pays for the installation of all cost-effective measures. Over a three-year period, 6000-7000 units will have been served. Niagara Mohawk will spend $12.5 million and reduce its demand by 5.8 mW during this period.

The program serves multifamily buildings of four stories or less, occupied by low and moderate income households. Qualifying buildings must meet a reasonably high threshold of electricity use, 15 kWh per square foot.

SyrESCO, the Syracuse-based nonprofit contractor for the program, must meet certain performance requirements: if measured savings reach 85% of the savings projected at

Table 1. Case Study DSM Programs

Utility	Program Type	Typical Measures	Financing	Specific PHA Program	$/Unit	Est'd kWh Svgs/ Unit
Bay State Gas	Audit/ Installation; utility pays 50% of installed cost	insulation, temp. controls, boiler resets, water heater wraps, low-flow showerheads, aerators	Yes, below-market rate loan	No	n/a	n/a
Boston Edison	Direct Installation	insulation, lighting fixtures and lamps, air sealing, EMS, low-flow showerheads	No	Yes	$350-$600	550, 1000 and 1100*
Connecticut Light & Power	Audit/ Installation; utility pays 50% of costs	attic insulation, windows, setback thermostats, controls, air sealing, and DHW measures	Yes, zero-interest loan	Yes	$1300-$4000	n/a
Niagara Mohawk	Performance ESCO Payment/Direct Installation; all-electric low-mod. income	lighting, insulation, reduced air infiltration	No	No	$1480	2700**
PSE&G	Standard Offer Contract w/ ESCOs	lighting, hot water measures, thermostats, air sealing, other cost-effective items	Outside financing can be secured by ESCO through performance contract	No	n/a	n/a

*based on 3 kWh/sq. ft. and an average area of 900 sq. ft.
**respectively for the Boston Housing Authority, Public Housing Authority and Multifamily programs
n/a = not available

the time of the audit, the company earns its full fee. SyrESCO-treated buildings must maintain their savings for a period of four years following installation, an incentive for the company to offer quality resident education and maintenance staff training.

Bay State Gas: A Subsidized Loan Program

Since 1985, Bay State Gas, an investor-owned Massachusetts utility, has offered a 3%-5% loan program aimed at multifamily buildings occupied by low-income households. Originally the program was offered to eligible buildings at 3% for terms of up to 10 years; today the loan term is 5%. The 2% difference enables the utility to establish a guarantee fund. The utility's contractor establishes a performance contract with each building participant, and the savings secured by the loan retires the debt service on the loan. The loan proceeds pay for the audit, measures design, specifications, subcontractor bidding, construction management, and the installation of the qualifying measures. Taken together, these "soft" costs add approximately 20% -25% to the total cost of the loan.

Eligible measures include heating system replacements and modification, hot water measures and replacement, controls, attic insulation, and infiltration reduction measures. Average loans range from $500-$2,000 per unit. Public housing authorities and publicly assisted housing developments are the primary target for the program. The program has served or is serving more than 1,000 households to date. The program was established by the utility before

demand-side management programs were conceived. Today, prospective measures are screened for their avoided costs, and the program is a part of the utility's DSM portfolio.

Last year, Bay State Gas instituted a separate program for commercial buildings, which includes master-metered multifamily buildings with more than four units that are on the commercial rate and that have gas heat and/or DHW. The program includes a free audit, plus incentives. The utility pays for either 50% of the installed cost of recommended measures, with the customer paying the other half, or it pays 33%, and finances the other 67% with a zero-percent loan. Typical measures include insulation, temperature controls, boiler resets, and DHW measures. To date, four PHAs have participated in this program.

Connecticut Light and Power: Subsidized Loan and Grant Program

Since 1990, Connecticut Light and Power Company (CL&P) has been conducting a pilot program with the Willimantic and Danbury public housing authorities. Under the terms of the program, CL&P provides a grant approximating 20% of the value of the qualifying measures, and a zero-interest loan to cover the remaining 80%. CL&P also paid for the costs of the audit and a portion of its contractor's costs in assisting the PHA to secure a waiver of the old PFS energy-related regulation. The total CL&P contribution is approximately 50% of the project cost. The Willimantic PHA property is a 100-unit high rise elderly building; the Danbury PHA development is a 60-unit two-story, attached townhouse development for families. Both developments are electrically heated.

Qualifying measures include attic insulation, window replacements, set-back thermostats, dampers and controls on a rooftop exhaust system, air sealing, low-flow showerheads, and hot water pipe insulation. Investments per apartment were approximately $4,000 at Danbury and $1,300 at Willimantic.

CL&P's contractor, an ESCO, is executing a performance contract with the PHAs for a twelve-year term at the developments. During this period, the contractor is responsible for annual resident education, maintenance staff training, equipment troubleshooting, and performance monitoring at the properties. The loan proceeds cover the soft costs of the contractor which precede and accompany the construction. The PHAs separately contract with the ESCO to provide the annual services as components of the performance contract. Any net savings achieved by the PHAs are theirs to keep for the duration of the contract with the ESCO. Net savings accrue whenever the sum of the post-retrofit fuel bill and the debt service to CL&P are exceeded by the pre-retrofit consumption level times the current per kWh price. HUD agrees to pay the PHA the latter amount every year; the ESCO guarantees the projected savings. If the savings fail to meet projections, the ESCO is liable to pay CL&P the remainder due on the debt service payment.

The Boston Edison Company: Grant and Cost-Share

Early in 1992, the Boston Edison Company (BECo) launched a public housing DSM program directed at 1,350 units in 13 developments owned by twelve PHAs in its service territory. All of the buildings are electrically heated; most are high-rise structures for the elderly. The utility pays for all audit costs and remaining soft costs. It also pays for the installation of all eligible measures whose lifetime savings exceed the avoided costs over the expected lifetimes of each. Hot water measures, air sealing and lighting measures are eligible for full BECo subsidy in virtually every building addressed by the program.

In the first year of the program, BECo paid up to its avoided costs for storm windows and window replacements which meet a minimum 2.2 R-value requirement. In most cases, the BECo cost share met slightly greater than one-half the installed cost of the measures. The state-owned properties borrowed their portion of the cost-share from the state housing agency which financed their construction. The housing authorities which manage them retired the loan from the savings over the ten-year period of the loan. The savings from both the windows and all of the other measures collectively could be dedicated as debt service payments. Without this feature, the savings stream to the PHAs would not be sufficient to retire the window cost-share within the ten-year limit set by the state agency. The BECo contractor independently guarantees the savings to each PHA.[2]

Public Service Electric & Gas of NJ: A Standard Offer Contract

Public Service Electric & Gas, a combined electric and gas utility, has designed a program geared to attracting ESCOs to deliver its needed capacity reductions. The utility has filed with the public service commission a program that features a "standard offer" contract for factories, businesses and housing developments with energy savings potential, to partner with ESCOs to sell saved therms and kWh to the utility. PSE&G has issued a standard offer to "unsell" or save capacity of 150 mW during its first block standard offer, of which 15 mW is saved for the residential sector. Treating 5,000 non-electrically heated units or

1,000 electrically heated multi-family units can yield 1 mW in savings, so the market is appropriate for performance contracting. The smallest acceptable bid is 400 kW. Additional bids of 200 kW can be made later by winning bidders.

The utility will also conduct an identical gas DSM standard offer contract for six million therms, at least two million therms of which are reserved for the residential sector. A typical housing authority can save conservatively 150 therms per apartment per year. Bids as small as 50,000 therms, or 330 units, are acceptable. Later, additional bids of 25,000 therms will be acceptable.

The attractiveness of a standard offer contract to a public housing authority, working in tandem with an ESCO, is that an outside party can put up the investment required. Furthermore, the utility will retire most of that investment with annual payments of 4 cents per kWh saved and 40 cents per therm saved. Even more attractive is the opportunity for a PHA to engage an ESCO to install expensive capital improvements with long payback periods—primarily window improvements—and pay for those improvements largely from the savings stream created by additional improvements with shorter paybacks. Lighting, hot water measures, thermostats and air sealing measures will generally cost a PHA less to install (the costs for which can be covered by an ESCO) than the avoided cost payments provided by the utility. Therefore, under the performance contracting formula available from HUD, the savings can be dedicated to retiring the debt for window replacements, boiler replacements and other long payback items. While the ESCO will keep most or all of the saved kWh and therm payments made by the utility each year, most or all of the annual fuel bill savings can be dedicated to pay back the more expensive measures. The PHA may retain any savings net of its debt service payments to the ESCO for the length of a performance contract held between the ESCO and the PHA.

The standard contract offer is available for 1993 and 1994. Winning contractors are responsible for verifying their savings and assuming the costs for such verification. The utility will pay only for verified savings. DSM payments will be made for a period of 5, 10, or 15 years, depending upon the average lifetime of the savings packages for bidding developments.

Summary Recommendations to DSM Managers

When designing and implementing multifamily programs, DSM managers can benefit from:

1. Speaking to area HUD offices and major PHAs in service territory before finalizing the program design;
2. Considering flexible direct incentives that can be structured as grants, low-interest loans or some combination of both;
3. Encouraging the participation of performance contractors to enable building owners and managers to raise their portion of cost-shared measures;
4. Requiring annual resident education, maintenance staff training, performance monitoring and feedback to facilitate the persistence of savings;
5. Working with PHAs and large multifamily property owners about bulk purchasing of the Super Efficient Refrigerator;
6. Making a standard offer contract to purchase cost-effective savings.

Endnotes

1. The two utilities were LILCO and PSE&G. The PSE&G program alluded to here is an earlier program and is not the same program as the one described under Case Studies.
2. The BECo program cost share provisions did not materialize in the first year of the program because of jurisdictional disputes between two state agencies regarding appropriate contracting processes. The BECo program design had no direct bearing on the dispute, which is now resolved.

References

Energy Information Administration. 1993. *Household Energy Consumption & Expenditure.* DOE/EIA-0321-(90), U.S. Department of Energy, Washington, D.C. 1993.