HUD Incentives Training Manual

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Performance Contracting Training

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CONTENTS

AUTHORS' NOTES:

This manual is in draft form. It is still a work in progress and subject to further review by HUD and other industry experts.

In October of 1998, the U.S. Congress passed H.R. 4194, the Quality Housing and Work Responsibility Act of 1998. As part of this legislation, the systems by which housing authorities' operating subsidies and capital funds are allocated are being overhauled Although the enabling legislation for the HUD incentives that are the topic of this manual was not repealed, nor explicitly amended, the mechanisms that are used to fund the incentives will be altered. The new regulations are due to be in effect in October, 1999 after a negotiated rulemaking process.

At the time of publication of this draft, it is impossible to tell how the incentives will be affected, although there is legislative language instructing that "… a public housing agency shall receive the full financial benefit from any reduction in the cost of utilities or waste management resulting from any contract with a third party to undertake energy conservation improvements in one or more of its public housing projects." (H.R. 4194).

This manual provides a discussion of how the existing systems for operating subsidy and capital funds are determined. This discussion is provided as background in order for the reader to understand the way the way the incentives are funded. Due the restructuring of these systems, some of this information will become obsolete. Other Sections, especially Unit 4, which outlines the process for implementing a performance contract, will remain pertinent after the new regulations go into effect.

PREFACE

This guidebook was developed by the National Center for Appropriate Technology (NCAT) with funds administered by the Department of Housing and Urban Development. NCAT, through its work with housing authorities, saw a need to update, expand and clarify the information available on the financial incentives for utility conservation that were legislated by the Housing and Community Development Act of 1987 (HCDA of 1987). The interim rule implementing changes to the Code of Federal Regulations resulting from this legislation was finalized in September, 1991. Since that time, the number of housing authorities taking advantage of the incentives has been increasing steadily. This manual's goal is to make a comprehensive examination of the issues that have arisen during that time and outline what the current state of practice is regarding these incentives.

The incentives allow housing authorities to capture the savings from steps they take to reduce utility costs. They give housing authorities an opportunity to reduce reliance on federal funds, both at the time of conservation retrofits and in the future. This manual attempts to guide housing authorities through the process of utilizing these incentives. It gathers in one place the information a housing authority will need to decide if any of the incentives make sense for them. It introduces the incentives and outlines steps for determining which one is most appropriate to their situation. It discusses how to implement each one once the housing authority has made that choice.

Inside you will find:

- A discussion of the opportunities for and barriers to conservation in public housing;
- An outline of the methods HUD uses to fund housing authorities;
- An overview of each of the HUD financial incentives for decreasing utility costs;
- A guide for housing authorities to determine are their best options for reducing utility costs;
- An in depth, step-by-step process for implementing a performance contract;
- A complete set of sample documents needed when using the incentives; and
- An electronic version of these documents.

Note that a glossary of common terms has been included in the "References" section of the book. The first time these terms are used in the text, they will be bolded. Citations in the text refer to sources in the bibliography.

This guidebook is designed such that it can be read from cover to cover, or picked up at the start of a chapter or unit on a specific topic that the reader is interested in. Unit 4, in particular, which outlines the steps necessary to implement a performance contracting project, is designed to be useable without having read the preceding units.

The use of the incentives legislated by the HCDA of 1987 in order to achieve efficiency gains and

decreased costs in public housing stock is a promising approach. This redirecting of dollars which are being spent for utilities into capital and other improvements at the housing authorities is a win-win situation for the housing authority, the tenant, the federal government and taxpayers alike. NCAT hopes this manual, by clarifying and providing guidance to the incentives, will encourage even more housing authorities to take advantage of these opportunities.

UNIT 1. RESOURCE CONSERVATION IN PUBLIC AND INDIAN HOUSING

CHAPTER 1

WHY CONSERVATION?

1. The Federal Funding Picture for Public Housing

Government subsidies for affordable housing for the poor were first provided under the U.S. Housing Act of 1937. (CLPHA, 1993) Today, more than 3,300 public and Indian **housing authorities** (HAs) manage more than 1.3 million public housing units, which are home to approximately 3.15 million people. (Sherwood, 1995) This does not include the approximately 2.5 million assisted housing units, in programs such as Section 8 and Section 202. (Ritschard, 1986) It is estimated that there are at least 1 million households on waiting lists for public housing and that only 29% of those eligible receive federal housing assistance. (CLPHA, 1993)

Funding for **public housing** has a long and complicated history. Because housing authorities have traditionally been unable to enter into private credit markets, they have had to rely on government funds and income generated from tenant payments for rent. As the income levels of the residents of public housing have decreased over the years and legislation tied the amount of rent that could be charged for shelter and utilities to tenant income, housing authorities have come to rely more and more on the contributions from the Federal government to meet capital improvement and maintenance needs. These and other factors have led to situations where some housing authorities have deferred maintenance and energy-related capital improvements.

Funding for housing authorities fall into capital subsidies, collectively known as modernization funds, and operating subsidy. Because housing authorities traditionally have been unable to borrow private capital, the capital subsidies had to cover 100% of the capital improvements needed in their buildings. A 1992 study for the National Commission on Severely Distressed Public Housing (NCSDPH) concluded that the need for modernization funds, of which energy improvements are a part, was so great that $4.7 billion per year for the next ten years would be required to erase the modernization deficit and keep up with new needs as they occurred. (CLPHA, 1993) The amount of Federal funding available has varied over the years. Fiscal year (FY) 1993 funding for modernization was $3 billion, a $1.7 billion shortfall over the needs estimated in the NCSDPH study. (CLPHA, 1993) Although funding for public housing has recently climbed, as long as housing authorities are heavily reliant on Congressional appropriations for capital improvement funds, they will be subject to potential funding decreases from a budget-conscious Congress looking for more ways to cut spending.

In 1998, new housing legislation, the Quality Housing and Work Responsibility Act of 1998, was passed. This bill has restructured the system for providing modernization funds and mandated an overhaul of the system that regulates the public housing operating subsidy. The operating subsidy is being designed through a negotiated rulemaking process that is due to be complete in October 1999.

2. Energy Costs of Public Housing

Energy costs are higher in public housing than in equivalent, privately-owned apartment buildings. (Ritschard, 1986) Almost two thirds of the buildings used as public housing were built before 1970, during an era when little consideration was given to energy efficiency. (CLPHA, 1993) Even structures built since that time generally don't make as efficient use of energy or water as could be. Public housing uses approximately 210.4 trillion **Btus** of energy each year. (EIA, 1995) The average public-housing apartment uses 58.2-million Btu per year at an average cost of $.89 per square foot of living space. (EIA, 1995).)

Utility costs represent 27% of total operating expenses for the average housing authority. This doesn't count utilities paid by residents, neither those covered by utility allowances, nor any excess charges for which the tenants may be responsible. (HUD Office of Inspector General, 1995) A 1985 study commissioned by HUD examined the cost of energy conservation opportunities. This study estimated that implementing all of the measures that would provide a 15 year simple payback would require investing between $879 million and $999 million. These improvements would yield $211 million per year in energy savings, for an average simple payback of four and a half years. (Abt Associates, 1988) An earlier study estimated that the investment needed would be $2.2 billion, with an annual savings of $328 million in 1980 dollars. This would result in a simple payback of 6.7 years. (Perkins & Will, 1980)

It is clearly in the best interests of all to use energy efficiency to reduce the estimated $1.5 billion (HUD Office of Inspector General, 1995) in federal funds that each year go to pay utility bills in public housing projects. It would allow the shifting of resources already being spent on utility bills into capital improvements, with many long-term benefits. Taking advantage of the conservation opportunities available in public housing could reduce operating costs for building owners and reduce HUD expenditures, while increasing property values and tenant comfort.

CHAPTER 2

HISTORY OF CONSERVATION FUNDING

While the government provides significant funding for capital improvements and conservation projects, there is still room for more cost-effective investment. Generally, private dollars have not been available to fund conservation projects, and many public conservation programs have not been available to or been widely used by housing authorities. This chapter briefly describes several of the funding mechanisms that have been available to housing authorities.

1. HUD Funding for Conservation Improvements

Most public conservation financing for housing authorities has been provided by HUD. These monies are known as **modernization funds**. They are granted through either the **Comprehensive Improvement Assistance Program (CIAP)**, for housing authorities with fewer than 250 units, or the **Comprehensive Grant Program (CGP)**, for housing authorities with 250 or more units. Eligible projects include structural repairs and improvements to buildings, conservation retrofits, and others. These funding mechanisms are also being overhauled by the new Housing legislation of 1998.

Although HUD spends significant amounts on conservation, e.g. between 1982 and 1991, housing authorities spent $1.46 billion in CIAP funds on energy conservation, there is on tracking of pre- and post-consumption. It is unknown how much energy was saved by these measures, nor those funded through the CGP.

HUD does require housing authorities to perform energy audits in all buildings every five years. These audits are known as "**compliance audits**." During the 1980s, HUD required that all conservation measures with a payback of less than 15 years were to be installed in housing authority buildings where modernization funds were requested, *when funding became available***.** Currently, the rule requires only that audits be performed and that cost-effective measures be installed – once again, "within the funds available to the PHA." (24 CFR 965.304, May 1, 1996)

2. Other Public Funding for Conservation in Housing Authorities

Some housing authorities have benefited from public funds made available by the **Low-Income Weatherization Assistance Program (WAP)**. WAP was created by the Energy Conservation and Production Act of 1976 and is run by the Department of Energy (DOE). This program, administered by the states, provides energy conservation services, also known as **weatherization**, to low-income people. Between 1978 and 1989, almost 4 million of the approximately 17 million qualifying low-income households in the United States were weatherized with federal funds.

There is a potential for bringing WAP funding into housing authority conservation projects, but it has not been done on a widespread basis. While WAP plays an important role in providing energy efficiency retrofits to low-income households, the bulk of weatherization under this program has been done in single family homes. Less than 10% of the 4 million households weatherized under WAP in 1989 were in apartment buildings with five or more units. About half of those were located in New York City (MacDonald, 1993). Few of those units were in housing authorities. Some states assign the use of WAP funds for work at housing authority properties a low priority. Their rationale is that PHA tenants already have federal help with housing and utility costs, so they prefer to direct their funds toward those whose rent and utilities are not subsidized. So DOE-sponsored weatherization has not been a large source of public funds for conservation in housing authority properties.

3. Private Financing for Conservation Improvements

Bank Financing

Housing authorities are permitted to borrow only with HUD approval. The passage of the Housing and Community Development Act of 1987 provides for specific circumstances where housing authorities may borrow funds from non-HUD sources to finance conservation projects. Since housing authorities are prohibited from encumbering their properties by using them as collateral by the Annual Contributions Contract they sign with HUD (HUD Form 53012A, 1995) the provisions of the HCDA of 1987 allowed the vast majority of housing authorities to borrow funds from non-federal sources for the first time.

Bonds

Housing authorities can issue bonds through an affiliate partner. A number of factors combine to discourage the use of bonds for funding conservation projects. **General purpose bonds**, which are backed financially by the entity issuing the bond, are seldom used because of the uncertainty of achieving the predicted energy savings over the life of the bond. **Tax exempt revenue bonds** offer attractive interest rates, but a good credit rating is necessary to obtain them. The high cost of issuing any type of bond usually dictates that they be issued for large amounts of money – larger than the amounts typically needed for conservation projects. For this and other reasons, bonds have rarely been used for funding projects.

Utility Demand-Side Management Programs

Some utilities operate **demand-side management (DSM)** programs. These programs aim to reduce demands on the utility's generation, transportation and distribution systems by improving the efficiency with which their customers use energy. Relatively few DSM programs have been geared toward use by housing authorities, although some utilities have been willing to provide a free energy audit and/or zero interest loans to pay for the installation of conservation measures.

Some housing authorities have used DSM funds to finance limited conservation projects, but the funds available have generally been too limited to pay for major conservation improvements. With the restructuring of the utility industries, DSM is in decline. It is unlikely that DSM programs will ever be a major source of funding for conservation measures in public housing, although housing authorities should investigate whether

their local utility has any funding or services available to them as they investigate potential funding sources.

4. An Alternate Way to Fund Conservation

Despite the overwhelming evidence that improving the efficiency of public housing through conservation can help everyone involved, the issue of how to fund such measures to their full potential has been difficult to resolve. Because housing authorities are not traditionally financed, implementing conservation through traditional funding mechanisms, such as going to private capital markets, has not been possible due to regulatory and statutory restrictions. HUD has always had incentives for conservation, but often more pressing needs would vie for the limited pot of funds available for capital improvements and maintenance. In 1987, Congress passed the **Housing and Community Development Act of 1987 (HCDA of 1987)** in order to allow housing authorities to take advantage of the opportunities for utility savings. The Act provided additional financial incentives for housing authorities to decrease their utility costs and allowed them to borrow from non-HUD sources to finance resource conservation retrofits. The next unit introduces the incentives legislated by the HCDA of 1987.

UNIT 2. OVERVIEW OF HUD INCENTIVES

THE HOUSING AND COMMUNITY DEVELOPMENT ACT OF 1987

The financial incentives of the **Housing and Community Development Act of 1987 (HCDA of 1987**), as promulgated in 24 CFR 990 and 905 (See Appendix C for a copy of the rule.) offer housing authorities a way to finance needed improvements to their buildings, thereby increasing property values and improving the condition of the public housing stock, through the stream of savings generated by the installation of energy-efficiency retrofits. Some of these financing mechanisms can allow work to be done without increasing the liability on a housing authority's financial statements. (Hansen, 1993). They allow federal modernization funds to be directed to other needed repairs. In addition, some of the incentives allow any extra savings to be kept by the housing authority, provided they go toward other eligible expenses.

One goal of the HCDA of 1987 is to reduce HUD's payments to public housing authorities for fuel bills. The Act includes incentives for housing authorities to reduce both the amount of energy used in their buildings and the rate that is paid for that energy. In order to promote increased energy efficiency in public housing, the Act allows two new methods for funding energy conservation measures: the **frozen base** incentive and the **additional subsidy** incentive. These methods do not override the standard PFS treatment of savings from conservation measures, but rather offer additional options that supplement the standard PFS method of funding for conservation projects and allocating savings. Projects not taking advantage of these incentives are still subject to the standard PFS rules. To spur housing authorities to look for better prices for their energy than might be available from their local utility, the HCDA also provides that savings from rate reductions will be split between a housing authority and HUD, under certain circumstances.

The higher-than-average energy use in public housing makes savings-dependent financing mechanisms especially attractive. A wide variety of conservation measures will pay for themselves through conservation savings within a decade or less. The new incentives make it possible for housing authorities to undertake the large-scale conservation projects necessary to tap the significant conservation savings that are available. Housing authorities, the federal budget and the residents of public housing can all benefit in the process.

The new funding methods rely on utility bill savings to fund improvements. As background, Chapter 3 will explain how utility bills are paid in housing authorities. Each of the new methods contains specific criteria that conservation projects must meet, and each option has its own risks, benefits and implications for the housing authority's finances. The remaining chapters in this unit (Chapters 4, 5, and 6) will introduce the standard PFS method of financing conservation in housing authority properties and the new funding options available under the HCDA of 1987.

UTILITY REIMBURSEMENTS

Note: The Quality Housing and Work Responsibility Act of 1998 is overhauling this system. When the new regulations go into effect, some of the information in this chapter will be obsolete. The following discussion has been kept now because the incentives of the HCDA of 1987 are so intricately tied to the past system of reimbursing housing authorities for their utilities. Understanding that system will help you understand the incentives. How the incentives will work with the system currently under development will not be known until the negotiated rulemaking process is complete.

Utility costs can be either **project-based** or **tenant-paid**. With project-based utilities, housing authorities are responsible for maintaining the utility account in their name and for paying the bills. With tenant-paid utilities, the tenant is responsible for maintaining the account in their name and for paying the utility bills. In the case of tenant-paid utilities, or when utilities are furnished by the authority, but consumption is monitored by the use of check meters, the tenant is allocated a certain amount of money to cover the bill. This amount is called the **utility allowance** and is deducted from the amount the tenant owes the housing authority. In each case, HUD will reimburse the housing authority for the utility expenditures through the **Performance Funding System (PFS)**, subject to certain eligibility requirements that are discussed in this chapter. Utilities include gas, heating oil, electricity, water and sewer. Garbage collection isn't considered a utility under the PFS. (HUD Office of Inspector General, 1995).

Note: the Quality Housing and Work Responsibility Act of 1998 contains language that will allow garbage collection to be considered for the incentives. Details are unavailable at the time of publication.

Additional information on the PFS can be found in 24 CFR Part 990 for public housing authorities, in 24CFR 950 for Indian housing authorities, and in HUD Handbook 7475.13 REV. Utility allowances are covered by 24 CFR 965.

It should be noted that the Performance Funding System is not the same thing as performance contracting, which occurs under the terms set forth in an **energy services agreement**. Funds for performance contracting are, however, delivered to housing authorities using formulae that are part of the PFS. Performance contracting is discussed in detail later in this unit and throughout the manual.

1. The Performance Funding System

The Brooke Amendments to the United States Housing Act of 1937, passed in 1968 and 1969, stipulated that low-income residents of public housing pay no more than 25% of their monthly adjusted income for rent. Reasonable utilities are considered a part of rent. The Housing Act of 1981 raised the maximum percentage to 30%. (PHADA, 1995) This amount is known as **total tenant payment** and must include costs for both shelter and utilities (24 CFR 5.613). (There are also two other options, in addition to the 30% of adjusted income, but this is most often the criterion that is used. See 42 US

Code 1437A(a)(1) for further discussion.)

Ceiling rents also impact the amount of money HAs can charge tenants. These ceilings, which reflect reasonable market value, are a limit on the amount of total tenant payment required for an apartment. (Public Law 104-99, 110 Stat. 40, Sec. 402. (b)) They are used in order to decrease the rent burden of working families in public housing, in the case that the total tenant payment owed by the family exceeds the market value of the housing. For instance, if a family's total tenant payment was calculated at $400, but the ceiling rent was $350, the family would only be responsible for paying $350. Ceiling rents may not be set lower than the monthly costs to operate the housing of the agency and to make a deposit to a replacement reserve. A housing authority must receive approval from HUD in order implement ceiling rents.

In 1969, Congress authorized HUD to make payments to housing authorities to help cover decreases in income resulting from the Brooke Amendment and shifts that were occurring in housing authority resident populations to lower-income tenants. In 1975, HUD initiated the Performance Funding System (PFS), which includes the mechanism by which a housing authority's annual operating subsidy eligibility is determined. (24 CFR 990.101(b), May 1, 1995) Housing authorities are eligible for reimbursement through the PFS for utilities, building maintenance and other expenses when such expenses exceed income. Two mechanisms are used to calculate the housing authority's eligibility: the **Allowable Expense Level (AEL)** and the **Allowable Utility Expense Level (AUEL)**. Both of these are discussed in greater detail below. The PFS deals with utility expenses through a different mechanism than it uses for other operating expenses due to the greater volatility of utility prices, the absence of consumption standards and the diversity of utility deliver systems (HUD Office of Inspector General, 1995).

The amount of operating subsidy for which a housing authority is eligible depends on a number of factors. The basic formula for reimbursement is **Allowable Expense Level (AEL)** plus **Allowable Utility Expense Level (AUEL)** minus **Projected Operating Income Level**. Projected operating income consists mostly of **Dwelling Rental Income,** which is computed by multiplying the average charge to tenants for rent times the **allowable occupancy percentage**. (A detailed discussion of projected operating income level and dwelling rental income can be found in 24CFR 990.109.) When authorized expenses outpace income, the housing authority is eligible for operating subsidy. If appropriations during a given federal fiscal year don't cover all eligible PFS costs, subsidies are pro-rated with each housing authority receiving the same percentage of total needs.

The Allowable Expense Level

The Allowable Expense Level is a per unit per month amount that approximates the cost of operating a well-managed housing authority of similar characteristics, excluding utility costs. (24 CFR 990.101(a), May 1, 1996) The AEL is determined by a number of steps that are outlined below.

The initial level of the AEL, for the first year that a project becomes eligible for operating subsidy under the PFS, is computed from a formula which considers a number of weighted factors. These factors include the number, age, size and type of units in the housing authority's portfolio; local government

wages; and a local inflation factor. This is known as the **Formula Expense Level**. The operating expenses of the housing authority in the previous year, the **base year expense level**, is compared to this formula-derived amount. If the base year expenses fall within a proscribed range around the Formula Expense Level, the AEL is set equal to the amount arrived at by the formula, plus any allowed increases for inflation or other factors. If the base year expenses are less than the established range, the bottom of the range is used as the base for determining the AEL. If it is above the top amount in the range, the top of the range is used as the base.

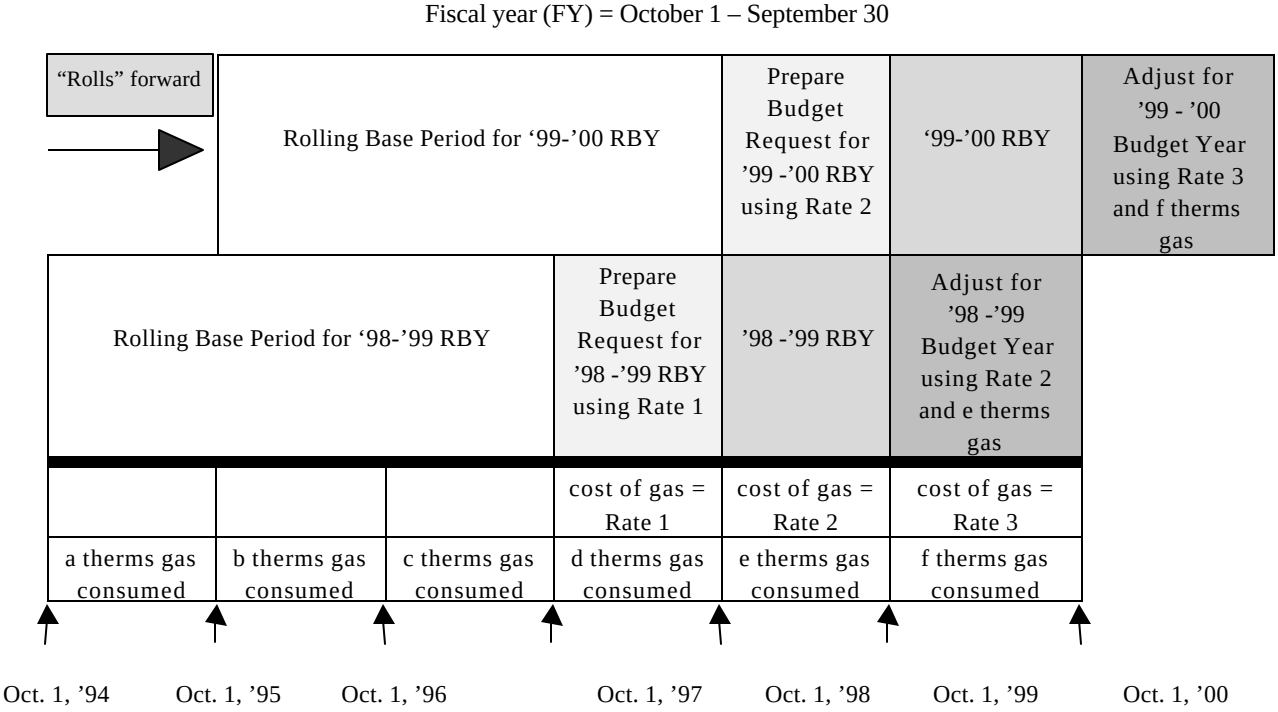
Each year after the establishment of the Formula Expense Level, the AEL is computed per 24 CFR 990.105 (d)(4-7), which allows for adjustments due to inflation, changes in the number of units at a project and costs attributable to changes in Federal law or regulations. The actual operating costs of the housing authority are considered only in as much as they may affect where the initial base for the AEL was set. Current operating costs do not affect the AEL. More details on computing the AEL can be seen in 24 CFR 990.105.

The Allowable Utilities Expense Level

The **Allowable Utilities Expense Level (AUEL)** is the amount of utility costs that housing authorities are eligible to be reimbursed for through the PFS. It is used in cases where the housing authority pays the utility bills and is not reimbursed by charging tenants for utility usage monitored by check meters. Several of the incentives from the HCDA of 1987 are based on altering the methods of determining the AUEL. The standard method is discussed below.

The AUEL is estimated when preparing a budget for the housing authority's new fiscal year, the **Requested Budget Year (RBY)**, using **HUD form 52722-A**. (See Appendix D.) This amount is not necessarily the amount that the housing authority will budget for utilities, but rather the amount for which they are eligible to be reimbursed. (E.g. the housing authority may anticipate a rate increase or decrease, and budget accordingly, even though the AUEL is projecting a different number.) The AUEL is based on an average of utility consumption over three years (the **Allowable Utility Consumption Level – AUCL**) times the utility rates in effect when the budget is requested. At the end of the fiscal year, the AUEL is adjusted to reflect actual utility prices and differences between actual consumption and the AUCL. This adjustment is done using **HUD form 52722-B**. (See Appendix D.) This process is illustrated in Figure 1 above. HUD and the housing authority share savings or expenses resulting from the year-end adjustment. How these savings are shared depends on the incentive being used. In most cases, adjustments to take into account variations in weather are not allowed, although some of the incentives of the HCDA of 1987 do permit such an adjustment to take place.

Figure 1. AUEL and Rolling Base Example



$$\text{'98-'99 AUCL} = \frac{a+b+c \text{ therms gas}}{3} \qquad \text{'99-'00 AUCL} = \frac{b+c+d \text{ thermsgas}}{3}$$

'98-'99 AUEL = '98-'99 AUCL × Rate 1 '99-'00 AUEL = '99-'00 AUCL × Rate 2

'98-'99 Adjusted AUEL = e therms × Rate 2 [actual '98-'99 consumption × actual '98-'99 rate]

'99-'00 Adjusted AUEL = f therms × Rate 3 [actual '99-'00 consumption × actual '99-'00 rate]

The Rolling Base

The rolling base period is the three year interval used to figure baseline utility use when computing the Allowable Utility Consumption Level (AUCL) for a public housing facility. This process is outlined in Figure 1. When preparing the budget for an upcoming fiscal year, the housing authority must average the energy used over the last three complete fiscal years. For instance, the rolling base period for a fiscal year beginning October 1998 would include consumption from fiscal years 1994, 1995, and 1996. This period would run from October 1, 1994, through September 30, 1997. Since budgets are prepared mid-year, there is a one year lag between the end of the rolling base period and the beginning of the fiscal year for which the budget is being prepared. This lag allows the collection of three full fiscal years of consumption data. The "rolling" in rolling base reflects the fact that the three-year period over which utility use is averaged is moved forward each year ("rolled" forward).

2. The Utility Allowance System

The utility allowance system is the mechanism by which federal assistance is provided to low-income, public-housing tenants who have individual accounts with utility companies and pay their own bills. Allowances are also used when the housing authority pays the utility company but check meters monitor individual tenants' consumption and they are billed for their use. (24 CFR 965.502). About 60% of the residents of public housing are subject to an allowance for at least one utility. Utility allowances average between $50 and $70 per month, and typically make up 30% to 50% of average total tenant payment. HUD paid an estimated $400 million to reimburse housing authorities for rent reductions resulting from tenant-paid utilities during 1994. These statistics strictly deal with what was set as the utility allowance and do not include consumption over and above that amount. (HUD Office of Inspector General, 1995)

Utility allowances are set based on the "reasonable consumption of energy by an energy-conserving household of modest circumstances." (24 CFR 965.505(a), May 1, 1996) They are designed to cover all of what a tenant would owe, if they were "reasonable" in their use In this way, the total tenant payment is not increased above the 30% of adjusted income mark. The allowance makes the tenant whole, so that there is a complete subsidization of the utility payment for the tenant with reasonable use. If, though, tenants are excessive in their consumption, they must use their own money to pay the difference to the utility company, in the case of **individual metering**, or to pay the housing authority an **excess use charge**, in the case that their use is being measured by check meters. (24 CFR 965.506, May 1, 1996) Surcharge schedules may also be established for housing authority-furnished utilities to estimate consumption for resident-owned major appliances, such as air conditioning. (24 CFR 965.501(b) Total tenant payment does not include charges for excess use, so the total amount of rent burden owed by a non-conserving tenant may exceed 30% of adjusted income. (24 CFR 5.613(b), January 1, 1997) . HUD recently published a "Utiltity Allowance Guidebook" to help housing authorities determine the level of utility allowances. (Hebret and Nolden, 1998)

A number of factors are to be evaluated when setting the utility allowance. These are outlined in 24 CFR 965.505 and include: the type of utility and equipment covered by the allowance, as well as the function for which it is used, e.g. whether the allowance is for natural gas to cover cooking, hot water, heating, or a combination of the three; the climatic location of the apartments; the size of the units and the number of occupants; the energy efficiency of the appliances and equipment; the physical condition and amount of insulation in the building; the temperature levels to be maintained in the apartment and the domestic hot water; and the type of structure. A consultant is usually hired to analyze energy use in each building and to determine what baseline energy use should be for each type and size of residence unit. The above data are combined with historical use data to determine the utility allowance.

Challenges to Setting Utility Allowances

Setting utility allowances is not without its problems. The formula used can produce assessments that are too high or too low. One source of inaccuracy occurs when the sample used to establish average utility usage does not accurately characterize the building in question. Energy use can vary widely, even for buildings of the same general style and age. Accurate results require monitoring and analysis for each

building, with a representative sample of the various types of apartments.

The location of a specific apartment within a building can also make a big difference in its energy consumption. Much of the heat from first-floor apartments, for instance, passes through the ceiling to heat the unit above. An apartment located at the outside corner of a building will typically have a larger heat loss in winter and heat gain in summer than will a unit with only one outdoor wall. Utility allowances seldom take such variations into account, however. As a result, some tenants will benefit from a utility allowance that is larger than necessary, while others will consistently use more energy than the utility allowance would indicate.

Housing authorities should also be aware of the impacts of re-setting utility allowances as part of a conservation project. The level of allowances are set using engineering estimates, and there is no direct feedback to the housing authority on actual usage, as the tenant has the bill in their name (unless check metering is used). It is possible that the measures are not performing as they should, but all the while the project appears to be meeting savings goals. Tenants may be shouldering the burden of poorly performing measures by paying bills or excess use charges for consumption greater than their newly set allowance. It is important, therefore, for housing authorities to track whether the allowances appear to be reasonable, and whether, after a "breaking in" period, large numbers of tenants are not able to pay for their utility usage out of the amount established in the new allowance.

Interactions between Utility Allowances and the Operating Subsidy

Note that utility allowances are not part of the Allowable Utility Expense Level. They are part of the housing authority's operating subsidy, which is determined by the formula operating subsidy = (AEL + AUEL) - Income. The level of the utility allowance affect the income of the housing authority by altering dwelling rental income. Total tenant payment includes the cost of utilities. **Tenant rent** is what the tenant is charged after he or she is credited for the amount of the utility allowance. This decrease in rent charged decreases dwelling rental income and increases the amount of operating subsidy for which the housing authority is eligible (24 CFR 5.603) The following example shows how these factors interact. If a tenant's income for the month is $400, he or she is responsible for paying $120 toward rent and utilities. Assuming a utility allowance of $50, the accounting would look like this:

Tenant's Income:	$400
Total Tenant Payment:	$120 ($400 × 30%)
Credit for Utility Allowance:	$50
Tenant Rent:	$70 (tenant pays housing authority)
Tenant pays utility company:	$50 (estimated bill)

So although total tenant payment is $120, the housing authority only collects $70. It is assumed that the remaining $50 of the 30% of adjusted income, which they are to contribute, is needed to pay the utility bill.

If the amount of the utility allowance changes, the amount of dwelling rental income received by the housing

authority will also change. For instance, in the example above, if the utility allowance increased to $75, tenant rent would decrease to $45 ($120 - $75). If (AEL + AUEL) remains constant, an increase in income will result in a decrease in operating subsidy. In this example, income decreased by $25, so operating subsidy would increase by a like amount. An increase in income will result in a decrease in operating subsidy. So changes in utility allowances do not affect the amount of money the housing authority is eligible to collect, just from whom they are collecting it (HUD vs. tenant).

In some cases, the utility allowance is higher than total tenant payment. In this case, the housing authority pays the tenant a **utility reimbursement**. (24 CFR 5.603) Using the tenant in the example above, the results would look like this for a case where the utility allowance was $150:

Tenant's Income:	$400
Total Tenant Payment:	$120 ($400 × 30%)
Credit for Utility Allowance:	$150
Tenant Rent:	$-30 (Housing authority pays tenant)
Tenant pays utility company:	$150 (estimated bill)

As this example demonstrates, altering the rent or utility allowances will affect whether money is flowing from the tenant to the housing authority or vice versa.

There are several reasons why a utility allowance may shift up or down. Changes in utility rates will affect the amount of money a tenant owes to a utility, even if consumption remains constant. When the rate paid for any one utility, including fuel cost adjustments, changes 10% or more, the utility allowance must be revised. (24 CFR 965.507 (b)). Tenants' utility bills can also decrease when conservation measures are installed.

Because changes in utility allowances are decoupled from the housing authority's financial picture by the altering of operating subsidy whenever utility allowances shift, they do not have a monetary incentive to conserve. Note that this decoupling is tempered somewhat in that operating subsidy is guaranteed by HUD, subject to pro-rating in years where there is not a full appropriation, while tenant payments are subject to difficulties in collection. This would seem to further decrease a housing authority's incentive to conserve, in that collecting from HUD is far more reliable than collecting from tenants.

CHAPTER 4

THE STANDARD PFS INCENTIVE

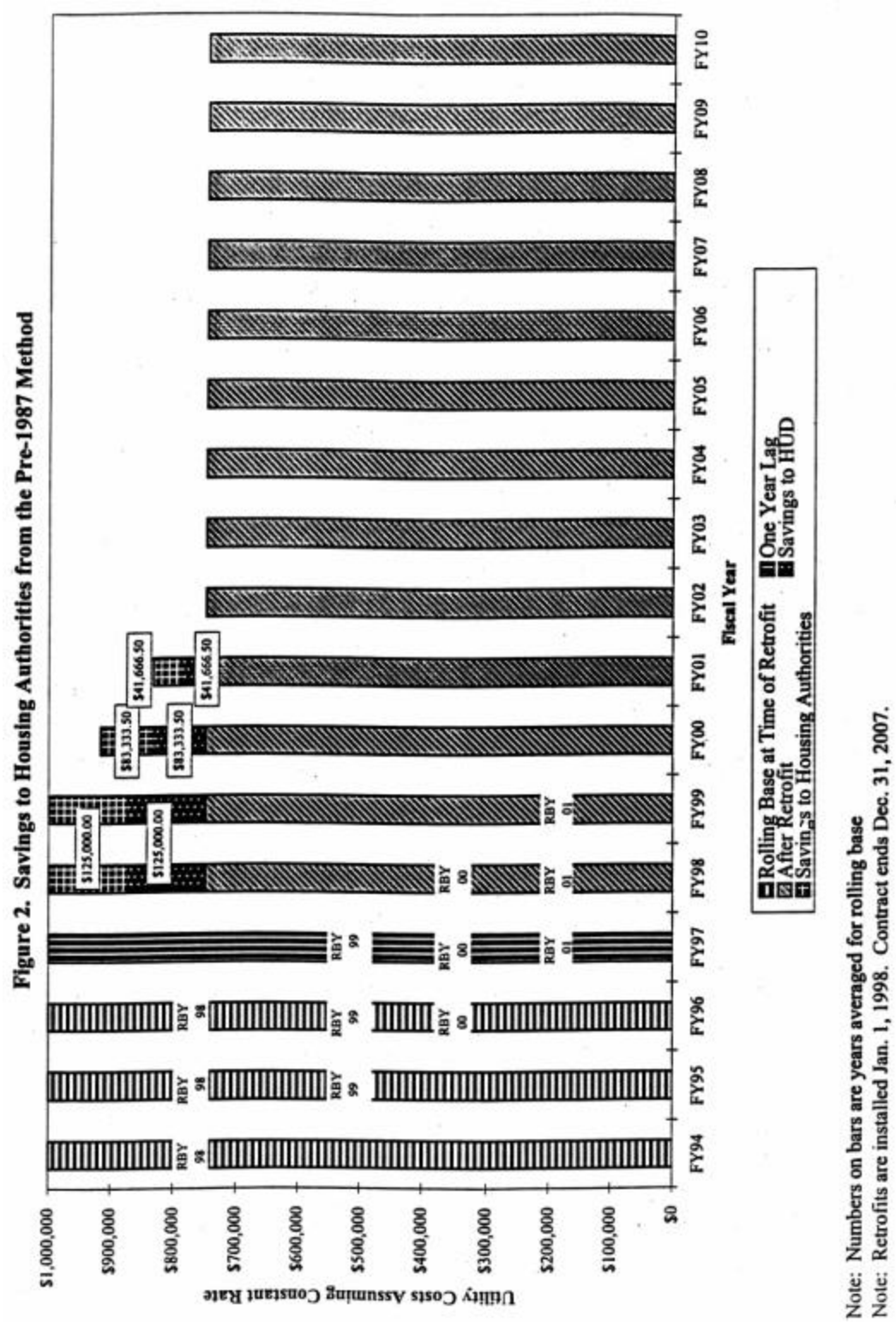
HUD had mechanisms in place, prior to the enactment of the Housing and Community Development (HCD) Act of 1987, for allocating costs when utility consumption varied from the projection made in the rolling base. These regulations are outlined in 24 CFR 990.110(c)(2)(I). At the end of the year, every HA which receives subsidy (except for those only receiving subsidy to cover annual audit costs) must submit a year end reconciliation using the 52722-B form. In this reconciliation, the projected consumption is re-valued at current rates and compared to the value of actual consumption times current rates. The HA is only compensated 50% of excess consumption and is allowed to keep 50% of any consumption savings. These methods are still in use today for any time actual consumption varies from the rolling base projection, unless the change in consumption is due to a conservation project using the frozen base incentive for funding. The standard PFS method is what is used if the housing authority uses modernization funds to implement conservation projects.

It is important to understand how this standard incentive works, in order to compare the differences the housing authority will see from using private financing and one of the incentives from the HCDA of 1987, and what they realize when using modernization funds to do a conservation project. That being said, the choice of whether to pursue non-HUD funding for such a project should be based on a number of factors, including whether sufficient modernization funds exist to implement the desired project. The financial incentives are only part of the decision-making picture.

1. Funding Conservation Projects with the Standard PFS Method

Figure 2 illustrates how savings would be split in a project using the standard PFS incentive. In this example, a housing authority implements efficiency measures in January 1998 using modernization funds. The efficiency measures result in a 25% savings. The rolling base in place at the beginning of the performance contract is calculated from the consumption in 1994, 1995 and 1996. For simplicity, this example assumes that the rate paid for the utilities stays constant. This makes the cost of utilities directly proportional to changes in consumption, so the illustration shows changes in dollars. At this assumed rate, the rolling base for 1998 is $1 million.

After the efficiency measures are installed, the cost of utilities decreases 25% to $750,000, a savings of $250,000 which is split evenly between the housing authority and HUD. As the base rolls forward each year, it begins to reflect this decreased consumption. In 1999, the first year after the measures are installed, the rolling base is comprised of data from 1995, 1996 and 1997. It is still using consumption information from the time before measures were installed. Savings are still $250,000. In the year 2000, the base period has rolled forward another year, so that the data used is from 1996, 1997 and 1998. This is the first time the rolling base reflects consumption from a year after the measures are installed. The rolling base amount has decreased to $916,667. The difference between the rolling base estimate and actual consumption has decreased from $250,000 to $166,667. HUD and the housing authority each keep $83,333.50. In the third year, the rolling base period is 1997, 1998 and 1999. Two out of the three years used to establish the rolling base are from years after the



Note: Numbers on bars are years averaged for rolling base
Note: Retrofits are installed Jan. 1, 1998. Contract ends Dec. 31, 2007.

measures were installed. The new rolling base is now set at $833,333. The difference between actual use and that estimated by the rolling base is $83,333. HUD and the housing authority each keep $41,666.50. By the fourth year, all the data used to calculate the rolling base is from after the measures were installed. There is no difference between the rolling base and actual consumption.

The total savings over the four years since the retrofits were completed is $750,000. Since HUD splits this with the housing authority, each gets $375,000. The project is still producing savings, in that utility costs remain lower than before the retrofits were installed, but the mechanism for projecting energy use has adjusted to this new lower rate. At this point, the housing authority sees no more savings from the project.

In the example above, the rate was held constant. When rates change, they affect the cost savings that are generated from a given amount of consumption savings. In the standard PFS incentive, HUD adjusts the dollar cost savings for changes in rates from that used at the time the budget was requested. The rate that was actually charged per unit of energy or water is used in determining what dollar amount the housing authority may keep.

2. The Standard PFS Method and Utility Allowances

There are no incentive mechanisms to allow the housing authority to capture conservation savings from conservation projects that address items involving utility allowances. The interaction between utility allowances and operating subsidy, when using the standard PFS method, is discussed in Chapter 3, "Determining Eligibility for Utility Reimbursements."

3. Standard PFS Pros and Cons

Many factors should be considered when deciding how to fund a retrofit project at a housing authority. In many cases modernization funds are available and are the best alternative. Here are some factors to consider when deciding whether to pursue another incentive, or stick with the standard PFS incentive.

Advantages to Using Modernization Funds for Conservation Projects

- **Easy, standard procedure.** The process for funding a project with modernization funds is well known and easy to follow. There is no need to learn a new process. The conservation project can be planned and implemented as part of the housing authority's regular modernization work.

- **No requirement that project be cost-effective.** Modernization funds are designed to provide housing authorities with a means of funding capital improvements in their facilities. There is no requirement that these projects be cost effective. For example, a boiler system may be at the end of its useful life. The reason for the project is replacement, not conservation, although some savings may accrue from it, and the housing authority may want to consider buying a model that is more efficient that the lowest cost option. Even if it appears that the project savings will cover project costs, the use of modernization funds allows the housing authority to avoid the **monitoring and verification (M&V)**

requirements that are involved in an additional subsidy or frozen base project.

- **No risk to the housing authority for performance of measures.** With the standard PFS method, there is no risk to the housing authority if the measures do not perform. There is no loan whose repayment is dependent on savings. If the measures do not perform as expected, the savings retained by the housing authority will be smaller than predicted, but they are not liable for covering loan payments that they may be unable to meet.

- **Standard timetable for completion of projects.** The other methods may require longer lead times and more staff time than a standard modernization project. If conservation measure is needed immediately, or the housing authority does not have time to shepherd a project through the other processes, sticking with the standard PFS treatment may be the best option.

Disadvantages to Using Modernization Funds for Conservation Projects

- **Conservation projects compete with other capital improvement needs.** A housing authority have more work that needs to be done than it has modernization funds to pay for. If a conservation project is done with these funds, they are not available for other work. The frozen base incentive and the additional subsidy are ways to do conservation work with sources of money that are unavailable for any other type of capital improvement. If these options are not used, the opportunity is lost to ever tap into these pots of money. A potential resource is lost.

- **Retained savings are lower than incentives from the HCDA of 1987.** With this option, the housing authority is only able to retain 50% of cost savings from decreases in consumption in any year. Because of the way the rolling base functions, even that 50% is eroded away until, at the end of 4 years, the housing authority sees no more savings. Conservation measures that produce significant, verifiable savings, are not rewarded proportionately. It must be noted, though, that while the retained savings are lower, the housing authority also is not responsible for paying for the energy retrofits out of those savings.

Summary

The standard PFS method is a well-known, low-risk option if modernization funds are available. It is the only method that can be used if there are not sufficient, verifiable savings from a retrofit to cover the cost of the project. It is not as advantageous in some ways as the other methods that will be discussed in the following chapters, but in many circumstances the standard PFS method may still be the best option for a given housing authority.

CHAPTER 5

THE FROZEN BASE INCENTIVE

The frozen base incentive is one of the options legislated by the Housing and Community Development Act of 1987 (HCDA of 1987) for financing conservation projects. This was precipitated by a successful HUD pilot program in several public housing complexes in the mid-eighties, which used performance contracting to leverage non-HUD funding for conservation projects. (See Appendix M for a case study of one of these projects.) Performance contracting is a separate concept from the frozen base incentive. It is a method of procuring energy management services and a obtaining a guarantee of savings. It can be used with both the frozen base incentive, and the additional subsidy incentive. It is generally accepted that a housing authority *must* use performance contracting when using the frozen base method. Under this incentive, housing authorities are allowed to keep all of the utility savings resulting from a conservation retrofit over a contract period of up to 12 years, provided at least half of the savings are used to retire the associated debt. Rules for the legislation are in 24 CFR 990 and 905.

1. Guidelines for Using the Frozen Base Incentive

HUD regulations spell out specific criteria that a project using the frozen base incentive must meet. These are outlined below.

Financing/Funding Sources. The project *must use non-HUD funding*. This can be obtained through an ESCO, utility or private bank. (See the "Funding the Project" section below for a discussion of these options.) If HUD funds are mixed into the project, the savings generated by the measures paid for with HUD dollars must be separated out from the savings claimed in the performance contract. This is done using engineering estimates and must be approved by the local HUD field office.

Allocation of Savings. *At least 50% of the savings must be used to pay the project's debt service*. Frequently, these projects are written so that more than 50% of the savings are used for financing the project, even up to 90% or more. Dedicating a higher proportion of the savings to payments allows an increase in the size and scope of the project, which is often a primary goal of housing authorities using the frozen base incentive. Any remaining savings may be used to train housing authority employees, counsel tenants, manage the program or other eligible costs. Savings may also be used to pre-pay the contract.

Savings Guarantee. When utilizing the frozen base incentive, the payment of the debt service *must be dependent on the savings being realized*. This has been interpreted by HUD to mean that the housing authority must obtain a guarantee that the estimated savings in consumption will materialize. The guarantee must at least equal the amount of the debt service. These guarantees may be in the form of an escrow account, line of credit, insurance policy, or bonding. (See Chapter 12, "Contract Negotiations," for a discussion of these alternatives.)

Length of Contract. The financing for a project using the frozen base method *may not exceed 12 years in length.* Most contracts are between 6 and 10 years long. Contracts generally don't extend to the maximum of the allowable time in order to build in a safety factor in case the contract needs to be extended for any reason. Contracts may not be extended, according to the regulations, for misjudgments on

performance of savings, but there may be circumstances where usage changes for reasons that are not within the control of the ESCO or the housing authority.

In addition to the requirements that must be met to satisfy HUD regulations, there are other factors a housing authority may wish to consider when deciding if using the frozen base is the best method for their project. These include:

Types of Projects. The frozen base incentive may be used for any project that will reduce utility consumption such that project savings will cover project costs, although some projects are better suited to them than others. (See Chapter 10 for a discussion of how to choose a project for performance contracting.) Trash removal costs are not treated as a utility in the PFS, but are instead reimbursed through the allowable expense level and are not eligible. (**Note:** language in the Quality Housing and Work Responsibility Act of 1998 has now added in trash expenses as eligible for performance contracting. Details are not yet available on how this will be handled.) Typical measures include: the addition of insulation to a building's shell; the installation of new heating, cooling or domestic hot water plants; the replacement of appliances, such as refrigerators, with more energy efficient models; the installation of more efficient lighting; or the purchase of water-conserving toilets.

Size of Project. HUD does not limit the size of eligible projects. But in order to attract an energy services company, projects must be relatively large, i.e. $200,000 or up. On the other hand, projects that are too large may prove difficult to manage, especially the first time a housing authority attempts performance contracting. (See Chapter 10 for discussion of how to choose a project for performance contracting.)

2. Funding the Project

Freezing the Rolling Base

For a performance contract to work, there must be a mechanism to capture the savings generated by the retrofit. For housing authorities with project-based utilities, this is done by freezing the rolling base. HUD stops shifting forward the three year base period that is used to establish the allowable utility consumption level (AUCL) at the beginning of each fiscal year. (See Chapter 3 for discussion of the rolling base.) Instead, HUD continues to reimburse the housing authority for utility costs at the pre-retrofit consumption level used in the budget year in which the measures were installed. The housing authority keeps 100% of the savings that result from the decreased consumption due to the work done under the performance contract (although at least 50% must go toward paying the debt service of the project). The base remains frozen for the length of the project financing. Once the contract is completed, the base is unfrozen.

An example of how this is done is illustrated in Figure 3. In this example, a housing authority implements efficiency measures through a 10 year performance contract beginning in January 1998 and ending in December 2007. The efficiency measures result in a 25% savings. The rolling base in place at the beginning of the performance contract is calculated from the consumption in 1994, 1995

and 1996. The freezing of the rolling base only freezes consumption, not the cost per unit of the utilities used to calculate the dollar value of that consumption. For simplicity, though, this example assumes that the rate paid for the utilities stays constant. This makes the cost of utilities directly proportional to changes in consumption, so the illustration shows changes in dollars. At this assumed rate, the rolling base for 1998 is $1 million. After the efficiency measures are installed, the cost of utilities decreases 25% to $750 million. For each of the ten years of the contract, the housing authority saves and keeps $250,000, totaling $2.5 million at the end of the contract period.

The housing authority will continue to retain some of the savings even after the end of the contract, because of the way the base is unfrozen and because of the standard PFS regulations for splitting costs or savings from variations in consumption away from the amount projected by the rolling base. The process used to unfreeze the base is as follows. For 2008, the first year after the completion of the contract, the base is calculated using the energy consumption levels from 1996, 1997 and 2006. These are the two years prior to the installation of the energy improvements and the year before the contract ended. In the second year, 2009, the rolling base is calculated using the energy consumption levels from 1997, 2006 and 2007 – the year before the measures were installed, the year before the contract ended and the year the contract ended. In the third year, 2010, the consumption from years 2006, 2007 and 2008 are used to calculate the base. These are the year before the contract ended, the year the contract ended and the year after the contract ended. At this point the calculations for the base are back to the normal pattern of beginning four years prior and ending one year prior to the requested budget year. The project is still producing savings, in that utility costs remain lower than before the retrofits were installed, but the mechanism for projecting energy use has adjusted to this new lower rate. At this point, the housing authority sees no more savings from the project.

The dollar amount of the rolling base for 2008, still assuming a constant cost for utilities, is $916,667. For 2009, it is $833,333. And for 2010, the base is set at $750,000. Note that for 2008 and 2009 the cost for actual consumption, $750,000, is still less than the amount of the rolling base. This results in a savings of $166,667 in 2008 and $83,333 in 2009 – a total of $250,000. The housing authority may keep a part of these savings, but because the performance contract is over, they do not keep 100%. The split reverts to the formula that is used whenever actual consumption diverges from the estimate provided by the rolling base and no performance contract is in effect – HUD splits the difference with the housing authority, each keeping 50%. So, for the first two years after the performance contract is over, the housing authority is still accruing savings from the efficiency measures that were installed. In this example, that amounts to an additional $125,000.

The total savings retained by the housing authority, over and above the costs of the project, are the excess savings during the contract period ($500,000) plus the savings retained as the base unfreezes ($125,000), for a total of $625,000.

Utility Rate Changes

In the example above, the rate was held constant. When rates change, they affect the cost savings that are generated from a given amount of consumption savings. Utility rate changes can affect whether the decrease in consumption generates enough dollar savings to cover the debt service for any particular year. It will also

affect the amount of dollar cost savings that are split between HUD and the housing authority. HUD uses form 52722-B (see Appendix D) to determine divergences in energy consumption from that projected by the rolling base. The changes in consumption are multiplied by the rate in effect that year to assign cost savings, which are split according to which incentive is being used. The amount of the cost savings depends on two factors: consumption and price. If prices change, the amount of money saved from a set decrease in consumption may go up or down, depending on the direction of the price change.

EXAMPLE

Assume an energy performance contract guarantees a savings of 25% from a pre-retrofit consumption of 1,000 **MCF** of gas use per year. This would result in a post-retrofit consumption of 750 MCF of gas. If at the time of the contract implementation, gas costs were $6.00 per MCF, the savings would be as follows:

(1,000 MCF- 750 MCF) × $6.00 =

250 MCF × $6.00 =

$1500

If gas costs went up to $7.00 per MCF, savings would alter as follows:

(1,000 MCF - 750 MCF) × $7.00 =

250 MCF × $7.00 =

$ 1750

If gas costs decreased to $5.00 per MCF, savings would be altered as follows:

(1,000 MCF - 750 MCF) × $5.00)

250 MCF × $5 =

$1250

So, an increase in energy costs above the cost in effect at the time the contract is signed will lead to an increase in savings retained by the housing authority. A decrease in energy costs will have the opposite effect. This impacts the dollars that are available for repaying the debt service.

Since performance contracts extend over many years, it is virtually certain that energy and water costs will change. In order to deal with this fluctuation, performance contracts often specify that the rate in effect at the time the contract goes into affect will be set as a **floor rate**. With this type of arrangement, the parties agree that for calculating savings, a lower rate will never be used, even if the actual rates fall below that rate. In the example above, the floor rate would be set at $6.00 per MCF of gas. With a floor rate in effect, dollar savings counted toward the project may go up beyond what was estimated (if rates increase), but will not go down. This way, an ESCO knows the minimum savings which will accrue to the project, assuming

that consumption savings projections are met. Note that the change in consumption is computed first, and then the appropriate rate is applied. This methodology is driven by the use of HUD form 52722-B, the form which is used to calculate savings. See Chapter 12 for a deeper discussion of savings calculation methodologies and the limits HUD has set as to what can be claimed as savings.

If the contract a housing authority is considering contains a floor rate provision, they should examine the provision carefully in the context of what the regulations allow. These state that the base usage (990.107(b)(1) and the savings (24 CFR 990.110(c)(2)(ii) must adjust for any utility rate changes. A housing authority may chose to sign a contract with a floor rate provision, and take the risk of rate fluctuations on themselves. In this case, it would be wise to have the ESCo provide them with a "sensitivity analysis", i.e. look at the range of possible rates and determine how much exposure the housing authority will have. An alternative strategy is to seek a waiver to institute a floor rate to be used in the annual utility reconciliations. There are a number of circumstances under which HUD has not granted such waivers.

The Frozen Base Method and Utility Allowances

A complicating factor arises when utility allowances are used, instead of the rolling base. Utility allowances may be paid to tenants under two scenarios. The first is **project-based utilities**, where **check meters** are used to determine the tenants' usage. In this case, housing authority is responsible for paying the utility bill, but charge the tenants based on a utility allowance and any excess use over that amount. The check meters allow the housing authority to charge tenants for excessive usage, or for major appliances such as air conditioners that aren't included in the allowance. In the second instance, **tenant-paid utilities**, utilities are billed through **individual meters** and the tenant is responsible for paying the bill to the local utility company. Allowances are based on "reasonable consumption of energy." (See Chapter 3, "Determining Eligibility for Utility Reimbursements.")

In the cases where utility allowances are used, and there is no rolling base, there are two options for capturing savings for a performance contract. Both require a waiver from HUD, since the current regulations do not deal with incentives in cases with utility allowances. The options are to: 1.) change to **master metering** with no utility allowance set or 2.) to set a "frozen baseline" for the utility allowance.

Master metering should be given serious consideration, now that the utility industries are deregulating. In addition to paying a far lower amount for **customer charges**, i.e. the fixed cost the utility charges per meter, a housing authority can also save significant amounts by purchasing bulk fuel from alternate suppliers. (See Chapter 7 for details in the rate reduction incentive.) In order to obtain price breaks from suppliers, a customer must purchase large quantities of energy. If the buildings have individual meters with tenant-paid utilities, bulk fuel purchase is not feasible, due to the many individual utility accounts. If a housing authority wants to consider changing to master metering, the individual meters may still be kept in place as **check meters**. This would allow the housing authority to take advantage of the bulk purchase of fuels. Unfortunately, if it used the check meters and established allowances, it still would be in the gray area, which the current regulations do not address, of how to capture savings from utility allowances.

The other option is to reset utility allowances for calculating tenant rent and set a frozen baseline for the utility allowances used to calculate dwelling rental income. This was first done at the Oakland Housing

Authority, through a waiver from the local HUD office. The solution was based on the formula for calculating operating subsidy: Operating subsidy = Expenses (AEL + AUEL) minus income. Utility allowances affect the housing authority's rent rolls through altering tenant rent – the amount tenants are charged by the housing authority after being credited for their utility allowance. (See Chapter 3, "Determining Eligibility for Utility Reimbursements.") If the utility allowance levels go up, dwelling rental income goes down. If utility allowance levels go down, dwelling rental income goes up. This change is reflected directly in the Authority's operating subsidy. Holding expenses constant, a decrease in dwelling rental income will be offset by an increase in operating subsidy. An increase in dwelling rental income will be offset by a decrease in operating subsidy. Therefore, under normal circumstances, if a housing authority performs conservation measures which result in decreased utility allowances, that savings is passed on directly to HUD.

In the Oakland case, the value HUD uses for utility allowances when determining dwelling rental income was established at a frozen baseline level equal to its pre-conservation retrofit level. The tenants were credited a revised utility allowance when calculating tenant rent. This served to decouple the change in utility allowances from the Authority's eligibility for operating subsidy. Because operating expense is computed by taking expenses (AEL-AUEL) minus income, if the income remained constant, operating subsidy remained constant. In actuality, the housing authority will collect a new, higher tenant rent. This differential funded the retrofit. This is very similar to freezing the rolling base, except that instead of freezing an expense at a higher level than post-retrofit reality, it is freezing income at a lower level. The end result of both is the housing authority can keep savings from a retrofit in order to pay for the work.

The following is an example of how this would work in the case of one tenant.

<u>Before performance contract</u>:

Tenant's Income:	$400
Total Tenant Payment:	$120 ($400 × 30%)
Credit for Utility Allowance:	$50
Tenant Rent:	$70 (tenant pays housing authority)
Tenant pays utility company:	$50 (estimated bill)

Operating subsidy = (AEL+AUEL) - $70

Housing authority receives tenant rent ($70) and operating subsidy

During the performance contract:

Tenant's Income:	$400
Total Tenant Payment:	$120 ($400 × 30%)
Credit for Utility Allowance:	$30
Tenant Rent:	$90 (tenant pays housing authority)
Dwelling Rental Income:	$70 (calculated using frozen baseline utility allowance)
Tenant pays utility company:	$30 (estimated bill)

Operating subsidy = (AEL+AUEL) - $70

Housing authority receives tenant rent ($90) and operating subsidy.

The housing authority keeps an extra $20 for this apartment for the duration of the performance contract.

If utility allowances must be adjusted during the term of the contract, those adjustments would be made to the pre-conservation baseline level of the utility allowance. At the end of the contract, the baseline would be unfrozen. The difference between the original revised allowance and the frozen baseline allowance would be added to the utility allowance currently used for calculating dwelling rental income. From this point forward, HUD would retain all savings from the conservation measures.

The process of revising utility allowances for calculating tenant rent must be done carefully to ensure that they are set accurately. Overestimating the savings potential of measures may result in adjusting allowances too low. In this case, it will appear that tenants are consuming excessive amounts of energy or water, when in reality the conservation measures are not performing as predicted. This ends up transferring the burden of non-performing measures from the ESCO to the tenant.

The Savings Guarantee

The frozen base incentive requires that repayment of the debt service be dependent on savings being obtained. This has generally been interpreted by HUD to mean that there must be a guarantee of savings. This protects the housing authority in the event of a shortfall in savings. This is especially critical due to the contractual and regulatory restrictions that limit a housing authority to using savings and other non-HUD funds for repaying these loans (HUD Form 53012A, Annual Contributions Contract, Part A, July 1995).

It is for this reason that performance contracting is used when a housing authority is doing a project under the frozen base incentive. The heart of a performance contract, whether used with the frozen base or the add-on subsidy, is a savings guarantee in which the ESCO guarantees that the average consumption savings resulting from the conservation retrofit will cover loan payments. The guarantees are designed to cover any shortfall that may occur between actual savings and those that were estimated by the ESCO and to satisfy the provision in 24 CFR 990.107(f)(1) that payment be dependent on savings. The **guaranteed savings**

are usually slightly less than the **estimated savings** the ESCO projects it can achieve – often in the range of 80% to 90% of estimated saving. Guaranteeing less than the estimated amount is fine, as long as the guaranteed amount is sufficient to cover the debt service on the project. It is a good strategy to structure the loan and other payments so that they are less than the estimated savings by 10% or so.

There is a fee involved for providing the guarantee, which will vary with the type of guarantee, the percentage of estimated savings that is being guaranteed and how the ESCO perceives its risk. This fee will affect the cost of the project. The higher it is, the more likely that some longer-payback measures may need to be dropped in order for the package to be paid for with savings within 12 years. See Chapter 12, "Contract Negotiations," for a deeper discussion of the various savings guarantee options.

Splitting Excess Savings

Excess savings are the difference between the amount needed to cover the debt service and other fees involved in the project (usually the amount of the guaranteed savings) and **actual savings.** HUD regulations for the frozen base incentive allow a housing authority to keep 100% of the savings generated during the life of the energy services agreement. At least 50% must go toward paying the debt service of the contract. This is different than when a housing authority uses a performance contract with the additional subsidy. In those cases, the HA retains savings using the standard PFS formula. As the rolling base progresses, the excess savings revert to HUD.

Generally, in order to finance a comprehensive package of measures, 75%-90% of the estimated savings are needed to cover the costs involved with the contract. The remainder of the savings may be kept by the housing authority, although some housing authorities may opt to split the excess savings with the energy services company. This sharing of excess savings provides the ESCO with incentive to search for all possible ways to wring savings out of a project. This is true not only on the front end, when choosing measures, but also after the measures are installed. Many retrofits need to be commissioned, i.e. inspected and tested upon installation to make sure they are performing as specified, or need continued maintenance to ensure optimal performance. A shared savings strategy provides ESCOs excellent motivation to stay on top of all aspects of the project.

An ESCO's fees may also be made contingent upon achieving a certain level of savings. See Chapter 12, "Contract Negotiations," for a detailed discussion of options for structuring ESCO fees.

Financing Methods

Financing for a project can be obtained from a number of sources. Often, the ESCO arranges the financing, either backing the loan itself or arranging a package through a third-party financier. A good ESCO will help the housing authority find the best financing that is available for the project, not just propose a single alternative. The housing authority may also arrange the financing itself.

Several types of financing are appropriate for performance contracting. These include tax-exempt bonds, general revenue bonds, tax-exempt lease-purchase agreements, low-interest loans from utilities, loans from conventional lending institutions and loans from state or government agencies. Currently, the most popular form of financing for performance contracting is tax-exempt leasing. Due to the tax-exempt nature of the

interest on the financing, the interest rates are generally lower than other feasible alternative. They can be arranged through many banks, so a housing authority can work with a local lender. With tax-exempt leasing, the housing authority may not own the equipment until such time as all of the lease payments are made. At that point, ownership is transferred from the bank to the housing authority. Conventional loans are more expensive than tax-exempt leasing, so are not utilized as often.

Another alternative is to issue a bond to finance the project. Although the interest rates for bonds are very attractive, the cost of issuing a bond is generally high, and doesn't vary much with the size of the bond. This dictates that bonds are usually issued for large sums – much larger than the costs of most conservation projects. For this reason and others, bonds are seldom used to finance energy performance contracts.

Occasionally, a local government or utility may have a program offering low- or no-interest loans to housing authorities for conservation work. These deals are perhaps the most attractive of all, but are fairly rare and vary regionally and over time. Still, when shopping for financing, it is worth approaching the local utilities and government agencies to see if any such programs exist.

It is vitally important to shop for the lowest interest rate possible. The difference of a percentage point or two may determine whether a package of measures will be cost-effective or not. Rates will vary depending on the size of the project (dollars borrowed), the length of the financing and the strength of the housing authority (as measured by credit rating, **PHMAP scores**, etc.). As of early-1998, interest rates for a 10 year, $2 million project with a strong housing authority fall in a range of 5.5% to 6.0% for bonds, 5.5% to 6.0% for tax-exempt leasing and prime + 1/4% for conventional loans. These rates may fluctuate significantly over time.

3. Pros and Cons of the Frozen Base Incentive

Note that the choice of whether to use the frozen base incentive is composed of a number of steps. First, is a cost-effective conservation project possible? Second, should the housing authority seek outside financing for the project or use modernization dollars? Third, if using non-HUD financing, should the housing authority accept the risk of managing the project itself, or should it use a performance contract with a savings guarantee? If using a performance contract, the choice of incentive - either frozen base or additional subsidy - will depend on many factors as well, and will probably not be decided until contract negotiations for the energy services agreement. (See Unit 3 - "Decision: Which Method to Use?" for a deeper discussion of this process.) That being said, the characteristics of a project using the frozen base incentive need to be understood in order to make the other decisions listed above. The discussion of pros and cons below can help with those decisions.

Note that anything in the discussion below that deals specifically to performance contracting will also apply to a performance contract that is funded using the additional subsidy incentive.

Advantages of the Frozen Base

- **Allows housing authority to retain savings.** HUD regulations allow a housing authority to keep 100% of the savings that are generated by a project using the frozen base incentive for the life of the financing. Although at least 50% of the savings must go toward repaying the debt service, there may be savings beyond what is needed to cover the costs of the project. These may be spent on other housing authority needs. The frozen base incentive is the only funding option approved by HUD that allows housing authorities to keep all of the savings from conservation measures. It is also the only option for funding conservation projects that freezes the rolling base. This allows the housing authority to keep savings for a much longer period than other funding methods. It should be noted, though, that all of the costs of the project must come out of these savings.

- **Increases funds available for capital improvements.** This option, like the additional subsidy incentive, allows the housing authority to use non-HUD funds to pay for the project. This increases the amount of capital improvements that may be done at the housing authority. Housing authorities won't be faced with the choice of allocating scarce modernization funds between resource-efficient improvements and other needed capital improvements.

- **Decreases risk to housing authority compared to the additional subsidy if using no savings guarantee.** Payment must be dependent upon savings being achieved. This is not a requirement with the additional subsidy. Since payment must be dependent upon savings, HUD has required a savings guarantee (whereby an ESCO takes responsibility for covering any shortfall in savings) to approve a contract under the frozen base incentive. Therefore, the risk of estimated savings not materializing, and possibly falling short of the savings needed to cover the debt service, is passed from the housing authority to the ESCO. This shifting of risk is one of the strongest reasons to consider a performance contract if using non-HUD funds, whether you're using the frozen base or the additional subsidy,.

- **Requires no up-front capital.** Although the savings to be realized can be significant, private financing for a large conservation project in public housing has not been allowed prior to the HCDA of 1987. By allowing housing authorities to enter into long-term financing agreements based on future energy and water savings, the Act opened the door to conservation financing. Housing authorities can now sign a contract with an ESCO which will provide financing to improve the efficiency of existing equipment and/or install new resource-conserving measures on a scale that has not before been possible.

- **Increases the value and functionality of housing.** Capital improvements such as a new boiler or heat pump, additional insulation or upgraded heating and cooling controls add to the value of the property, as does the increased resource efficiency. Tenant comfort is also often improved. These benefits can accrue from a conservation project funded by any means, but the option of obtaining private financing, using either the frozen base or the add-on subsidy, expands the potential number of projects by expanding the monetary resources beyond modernization funds.

- **Allows alternate procurement process.** With a performance contract, the procurement process is

much different than in a standard capital improvement project. The only portion subject to competitive bidding is for choosing the ESCO. The process used is that for competitive proposals, as outlined in 24 CFR 85.36(d)(3). Even that process is unusual in that it is proposal-based and not subject to requirements to chose the lowest bidder. Technical factors may be weighed more heavily than the price of the audit. Once the ESCO is chosen, it is responsible for the remainder of the project and the housing authority is not required to do more bidding, unless they decide (for cause) not to use their original ESCo choice after the audit phase. (24 CFR 965.308(a))

- **Provides turnkey conservation services.** Project design, financing, construction management, loan guarantee – all can be provided by the ESCO. This minimizes the housing authority's administrative involvement in the project. Once the energy services agreement is signed, the housing authority's role consists primarily of issuing approvals and monitoring the progress of the project. (See Unit 4 for information on the process leading the signing an energy services agreement.)

Disadvantages of the Frozen Base Incentive

- **Long lead time.** Arranging a performance contract involves a series of steps by the housing authority and approvals by HUD, a process that can take some time. This longer lead time can be a drawback, especially where badly needed measures with a short payback are concerned.

- **More paperwork.** The process of procuring a performance contract generates a sizable volume of paperwork, and includes numerous procedural hurdles. All the paperwork must be done correctly, and the legal and procedural requirements must be carefully observed for the project to be successful. (See Unit 4 for a discussion of this process.) A housing authority will invest a considerable amount of staff time and effort to bring a performance contract on-line, but these expenses can be reimbursed through energy and water savings.

- **Higher total project costs.** Costs are increased because the ESCO charges for its overhead in planning the project, for arranging and guaranteeing financing and for monitoring the project after construction. On the other hand, many of these activities would have to be done by housing authority staff. So much of the increased cost is merely a shifting of those costs into the contract.

- **"Married" to one contractor.** There is a negative side, as well as a positive one, to the convenience of dealing with a single contractor. Once an energy services agreement is signed, the performance contract commits the housing authority to a long-term agreement that is not easy to back out of. If ESCO employees are not responsive to problems or do not work well with housing authority staff, it can at best make the housing authority's job more difficult. Therefore, the RFP, evaluation and interviewing processes for selecting an ESCO are extremely important. (See Chapter 10 for a discussion of "Choosing an ESCO.")

- **Cost of the energy audit.** The first task for the ESCO that wins the contract is to perform a thorough energy audit. The ESCO then puts together a proposed package of conservation measures and a financing package. If the housing authority and the ESCO are unable to come to an agreement on the conservation measures proposed, or on the financing package, and fail to produce a signed performance contract, the housing authority is still responsible for the cost of the ESCO's audit. This

type of audit generally costs significantly more than housing authority "compliance" audits (those done every five years to satisfy 24 CFR 965.302), due to their greater depth and complexity. Although costly, these audits may serve as a compliance audit and can be paid for from modernization funds. If the housing authority proceeds with a performance contract with another ESCo, the cost of both audits is allowed to be rolled into the financed project costs, if the project will bear the expense.

4. Summary

The keys to success with the frozen base incentive, as with any performance contract, are to attain a predictable income stream from conservation savings, to fund the installation of conservation measures at the lowest-possible interest rate and to fund the improvements over a long-enough term to take advantages of all the savings possible in the building. Unit 3 "Decision: Which Method to Use?" discusses how to determine whether the frozen base method is the appropriate route for your housing authority. Unit 4, "The Performance Contracting Route," spells out details of the process leading to a successful performance contracting experience.

CHAPTER 6

THE ADDITIONAL SUBSIDY INCENTIVE

An alternative to the frozen base incentive for funding conservation projects is to use the **additional subsidy** method, which is also known as the **add-on subsidy**. The defining characteristic of this incentive is an alteration in the cash flow between HUD and the housing authority. This alternate reimbursement methodology enables the housing authority to obtain funds to repay the debt service on the non-HUD financing. Because the rolling base is not frozen, another method is needed to allow the housing authority to cover the debt service. HUD increases the housing authority's operating subsidy by the amount needed to amortize the loan for the length of the financing contract. Although a savings guarantee is not required using this method, HUD does require that utility cost savings be large enough to pay for the debt service. The additional subsidy HUD provides is subject to a maximum equal to the amount of savings for that year. If savings do not cover the amount due on the financing, the deficit will be offset from the housing authority's eligibility for operating subsidy the following year. This means that with the additional subsidy method, the housing authority assumes the risk for the project rather than an ESCO. Because of these factors, the housing authority may want to consider using an ESCO for a performance contract and obtaining a savings guarantee when using the add-on subsidy for conservation projects. (See Chapter 5, "Frozen Base Incentive" for more details on performance contracting, especially the "Savings Guarantee", "Splitting Excess Savings", "Pros and Cons" and the "Summary" sections.)

Savings from the project are dealt with by the standard PFS rules, i.e. the housing authority only keeps 50% of the savings for the first four years as opposed to the 100% for the length of the financing allowed with the frozen base method. At first glance it may appear that this differentiation in retention of savings would automatically make the frozen base incentive the better alternative. But with the frozen base, the housing authority does not receive any additional operating subsidy. Unit 3, "Decision: Which Incentive to Use?" provides more detail on how to evaluate the various incentives to determine which is the best option for the particular circumstances of individual housing authorities.

1. Guidelines for Using the Additional Subsidy Incentive

A project utilizing the additional subsidy incentive must meet specific criteria spelled out in HUD regulations. These factors are outlined below.

Financing/Funding Sources: The project *must use non-HUD funding*. This can be obtained through a utility, private bank or through an ESCO if the housing authority has opted to use a performance contract. (See the "Funding Additional Subsidy Projects" section below for a discussion of these options.) If HUD funds are mixed into the project, the savings generated by the measures paid for with HUD dollars must be separated out from the savings claimed for the project. It is important to remember this when evaluating the feasibility of a project, for the reasons outlined in the discussion of the savings guarantee. The separation of savings is done using engineering estimates and must be approved by the local HUD field office. If the housing authority is not using a performance contract for their conservation project, they will have the responsibility for developing this methodology.

Allocation of Savings: There is no predetermined way that any savings retained by the housing authority must be spent, as there is with the frozen base incentive. See below, "Funding the Additional Subsidy," for a deeper discussion of savings.

Savings Guarantee: When using the add-on subsidy, there is **no** requirement for a savings guarantee. But HUD does require that the repayment of the debt service *must be covered by the savings of the project.* If there is a shortfall in savings, the discrepancy will be offset from the housing authority's eligibility for operating subsidy the following year. This means that the housing authority must be very certain that the savings will occur in the amounts projected or opt to use an ESCO and obtain a savings guarantee. Mutually agreeable verification procedures should be developed between HUD and the housing authority. (See the discussion of "Monitoring Conservation Savings" in Chapter 13.)

Length of Contract: An additional subsidy project *may not exceed 12 years in length.* This incentive is often used for relatively short projects, whose savings are very well assured, or for projects where HUD has allowed the use of **stipulated savings**. Contracts may only be extended, if HUD determines it is needed due to "changed circumstances rather than miscalculation or misrepresentation by the contractor or PHA." (24 CFR 990.110(e)(3)) If the housing authority doesn't have a savings guarantee and is bearing the risk for whether the project performs, it may be wise to use the additional subsidy only for these "safer" types of projects.

In addition to the requirements that must be met to satisfy HUD regulations, there are other factors a housing authority may wish to consider when deciding if using the additional subsidy is the best method for their project. These include:

Risk: A housing authority may opt to manage the project itself, without obtaining a savings guarantee from an ESCO. The housing authority should be aware, though, that there is a possibility that it will not receive the full amount needed to amortize the loan. If the savings ever fall short of projections and below the loan payment amount, HUD will decrease the housing authority's operating subsidy in the following year. This may cause financial hardship for the housing authority if it does not have access to other funds to re-pay the loan. Because the loan is considered an operating expenditure, comprehensive grant and CIAP dollars may not be diverted from other modernization projects to repay debt service. On a positive note, though, the housing authority still has tapped funds that would not have been available to it otherwise, even if it must delve into its operating funds or other pots of money to repay a loan when the additional subsidy amount is cut due to savings being too low.

Types of Projects: The additional subsidy may be used for any project that will reduce utility consumption. (See Unit 3 for discussions of how to choose conservation projects and evaluate which is the best type of funding.) There are instances where a performance contract is impractical and the additional subsidy is a better choice due to the flexibility the housing authority has to manage its own project. One example of this would be cases where measures must be installed quickly (e.g. a central boiler system that is frequently breaking down) and the relatively long lead time required to implement a performance contract would impose a hardship. Single retrofit projects with assured, quick paybacks, such as replacing heating systems with new, more efficient models or switching to a less expensive fuel might also be good candidates for using the additional subsidy. Longer, more complicated projects, which have greater possibilities of the savings

not meeting projections, are better left to performance contracting, using either the frozen base or the add-on subsidy.

Size of Project: HUD does not limit the size of eligible projects. If the housing authority wishes to manage the project themselves and assume the risk that savings will be achieved, it may be best to use the additional subsidy for relatively small projects. If they chose to use a performance contract, any size project is suitable for the additional subsidy, although larger projects will better attract ESCo interest.

2. Funding the Additional Subsidy

There are two aspects to the additional subsidy that help fund conservation projects and give housing authorities an incentive to undertake these projects. These two benefits are discussed below.

The Increased Subsidy

When using the additional subsidy, projects are not directly funded from savings, as in a performance contract. Instead, the operating subsidy received by the housing authority is increased by the amount needed to amortize the financing used for the improvements. In order to be eligible for this increased subsidy, though, the housing authority must demonstrate that savings in an amount at least equal to the loan payments were achieved. If the savings do not cover the loan amount, HUD will decrease the operating subsidy the following year. This increase in subsidy remains in effect during the life of the financing contract used for the project. Housing authorities benefit from increasing the pool of money that is available to them from capital projects.

Savings

It is important at this point to differentiate between two definitions of savings. When determining operating subsidy for an add-on project, HUD looks at the energy that would have been expected to be used if the measures had not been installed, and compares that to the actual usage. This consumption is adjusted for any rate changes and may be adjusted for a heating degree day factor. (Heating degree days are discussed more in Chapter 8, "Steps to Choosing the Incentive.") It is this type of savings that is used to determine the cap on additional subsidy for which a housing authority is eligible.

The other type of savings is that done by comparing the usage estimated by the rolling base against actual usage. Once again, consumption is adjusted for changes in rates, but there is no heating degree day adjustment. For decreases in consumption resulting from conservation measures installed using the additional subsidy, savings are split between the housing authority and HUD using the standard PFS formula for allocating savings. The rolling base is not frozen and any savings between consumption projected by the rolling base and actual use is split evenly between the housing authority and HUD. As energy consumption decreases after the measures are installed, the rolling base will adjust and the amount of utility subsidy a housing authority receives will decrease. After four years, the rolling base has adjusted to take into account the new, lower utility usage and the housing

authority retains no more savings. The project is still producing savings, but the mechanism used to project

energy use for budgeting purposes does not see them anymore.

Figure 4 illustrates how this process works. In this example, a housing authority implements efficiency measures in January 1998 using modernization funds. The efficiency measures result in a 25% savings. The rolling base in place at the beginning of the performance contract is calculated from the consumption in 1994, 1995 and 1996. For simplicity, this example assumes that the rate paid for the utilities stays constant. This makes the cost of utilities directly proportional to changes in consumption, so the illustration shows changes in dollars. At this assumed rate, the rolling base for 1998 is $1 million.

After the efficiency measures are installed, the cost of utilities decreases 25% to $750,000, a savings of $250,000. As the base rolls forward each year, it begins to reflect these savings. In 1999, the first year after the measures are installed, the rolling base is comprised of data from 1995, 1996 and 1997. It is still only using consumption information from the time before measures were installed. Savings are still $250,000. In the year 2000, the base period has rolled forward another year, so that the data used is from 1996, 1997 and 1998. Now, the first year's consumption reflecting savings from the measures is averaged in. The rolling base amount has decreased to $916,667. The difference between the rolling base estimate and actual consumption has decreased to $166,667. In the third year, the rolling base period is 1997, 1998 and 1999. Two thirds of data are from after the measures were installed and it is now set at $833,333. The difference between actual use and that estimated by the rolling base is $83,333. By the fourth year, the rolling base is only using data from after the measures were installed. There is no difference between the rolling base and actual consumption. The total savings over the four years since the retrofits were completed are $750,000. Since HUD splits this with the housing authority, each gets $375,000. The project is still producing savings, in that utility costs remain lower than before the retrofits were installed, but the mechanism for projecting energy use has adjusted to this new lower rate. At this point, the housing authority sees no more dollar cost savings from the project, but does still continue to receive the additional subsidy amount.

The total benefit that the housing authority realizes will depend on the dollar amount of the loan, and whether they received the full additional subsidy amount every year (i.e., did savings in any year fall below the amount needed to amortize the loan?) In addition, unlike in our example above, utility rates will change over time. HUD accounts for changes from projected to actual utility rates to adjust the dollar cost savings before comparing actual utility costs to the AUEL when determining what dollar amount the housing authority may keep. (See below)

Demonstrating Savings and Utility Rate Changes

With the additional subsidy incentive, the project costs are not paid for from retained savings [(pre-consumption multiplied by current rate) - (post-consumption multiplied by current rate)]. Instead, the housing authority receives an additional subsidy in the amount needed to pay the debt service and annual fees of the project. The one caveat is that the project cost savings must equal or exceed the amount of the additional subsidy.

The crux of the issue relating to rates is how the project consumption savings are demonstrated to HUD, and how the dollar savings are computed. In order to protect themselves, whether using a performance

contract or managing the conservation project themselves, the housing authority should make provisions for demonstrating the level of consumption savings from which dollar savings are derived. With a performance contract, this can be done by the energy services company providing monitoring and verification (M&V) services. If there is no ESCo involved, the housing authority must develop it's own M&V strategy. In either case, the system for demonstrating consumption savings should last throughout the term of the loan , should meet HUD approval and should be defendable to HUD and others.

Once a strategy for determining pre- and post-consumption has been nailed down, rate interactions must be considered. Cost savings are calculated by multiplying the consumption expected without the retrofit by the current rate and doing the same for actual consumption. The difference is the cost savings. Heating degree day adjustments are also allowed, with HUD's approval. (24 CFR 990.110 (e)(1) and (2)). For a given amount of consumption savings, the dollar savings will vary up with a higher rate, and down with a lower rate. (See "Utility Rate Changes" in Chapter 5.) So it is possible that the provision for decreasing the subsequent year's operating subsidy due to shortfall in savings could be invoked due to a lowering of rates. This is known as **rate risk**.

If the housing authority manages the project, there is no one to shift this risk to. The housing authority should evaluate what their exposure may be if the rates decrease. If using a performance contract, it may be possible to shift some of the risk to the ESCo. Often, though, an ESCo will require a floor rate to be in the contract, in order to mitigate the risk to themselves. This is a negotiable point that the housing authority can take up with the ESCo. With the frozen base incentive, HUD has in limited circumstances granted floor rates for use in calculating the savings the housing authority may retain. (See "Utility Rate Changes" in Chapter 5.) It is possible that they may consider this for an additional subsidy, but unlikely.

The Additional Subsidy and Utility Allowances

As with the frozen base incentive, there is no mechanism for capturing savings for the additional subsidy in the case of tenant-paid utilities. In addition, the incentive structure of keeping 50% of the decrease in consumption from the rolling base estimate for the first four years of the project does not work in the case of tenant-paid utilities.

The options for capturing savings are the same as for the rolling base. Both require a waiver from HUD, since the current regulations do not deal with this situation. The options are to change to **master metering** with no utility allowance set or to set a frozen baseline for the utility allowance. the master metering option is discussed in Chapter 5 under "The Frozen Base Incentive and Utility Allowances". As with the frozen base incentive, master metering should be given serious consideration, now that the utility industries are deregulating.

The authors are aware of at least one project (at Stark Metropolitan Housing Authority in Canton, OH) where HUD allowed the use of the additional subsidy incentive on a project with tenant paid utilities. The strategy used was similar to what was done with the frozen base method for the Oakland Housing Authority. Utility allowances were reset for calculating tenant rent and a frozen baseline *for the utility allowances* was set and used to calculate dwelling rental income. In this case, the savings would not be used to meet a loan payment, but to serve as the cap on the amount that HUD would pay in additional

subsidy. The increase in operating subsidy was used to cover the debt service. A housing authority could also ask that the incentive mechanism of splitting savings for the first 4 years of the contract be mimicked in its waiver request, although this was not done in the case cited above.

The Oakland solution used with the frozen base incentive was based on the formula for calculating operating subsidy: Operating subsidy = Expenses (AEL + AUEL) minus income. Utility allowances affect the housing authority's rent rolls through altering tenant rent – the amount the tenant is charged by the housing authority after being credited for their utility allowance (See Chapter 3, "Determining Eligibility for Utility Reimbursements"). If the utility allowance levels go up, dwelling rental income goes down. If utility allowance levels go down, dwelling rental income goes up. This change is reflected directly in the Authority's operating subsidy. Holding expenses constant, a decrease in dwelling rental income will be offset by an increase in operating subsidy. An increase in dwelling rental income will be offset by a decrease in operating subsidy. Therefore, under normal circumstances, if a housing authority performs conservation measures which result in decreased utility allowances, that savings is passed on directly to HUD.

In the Oakland case, the value HUD uses for utility allowances when determining dwelling rental income was established at a frozen baseline level equal to its pre-conservation retrofit level. The tenants were credited a revised utility allowance when calculating tenant rent. This served to decouple the change in utility allowances from the Authority's eligibility for operating subsidy. Because operating expense is computed by taking expenses (AEL-AUEL) minus income, if the income remained constant, operating subsidy remained constant. In actuality, the housing authority will collect a new, higher tenant rent. This differential funded the retrofit. This is very similar to freezing the rolling base, except that instead of freezing an expense at a higher level than post-retrofit reality, it is freezing income at a lower level. The end result of both is the housing authority can keep savings from a retrofit in order to pay for the work. In the case of the additional subsidy, this extra amount would be used to determine the cap on extra operating subsidy eligibility.

The following is an example of how this could work in the case of one tenant for one month. In actuality, this would occur for all of the housing authority tenants and savings would be annualized.

Before the additional subsidy:

Tenant's Income:	$400
Total Tenant Payment:	$120 ($400 × 30%)
Credit for Utility Allowance:	$50
Tenant Rent:	$70
Tenant pays utility company:	$50 (estimated bill)

Operating subsidy = (AEL+AUEL) - $70

Housing authority receives tenant rent ($70) and operating subsidy

Amount for determining additional subsidy cap (savings amount):

Tenant's Income:	$400
Total Tenant Payment:	$120 ($400 × 30%)
Frozen baseline utility allowance:	$50
Credit for Utility Allowance:	$30
Savings:	$20
Tenant Rent:	$90 ($120 - 30)
Tenant pays utility company:	$30 (estimated bill)

Operating subsidy = (AEL+AUEL) - $90 + amount of additional subsidy (= amount of debt service payment, subject to savings cap).

Housing authority receives tenant rent ($90), operating subsidy and additional subsidy amount. Note that the operating subsidy is now $20 lower than before the additional subsidy conservation project, but tenant rent collected is $20 higher. The housing authority and the tenant break even, and the savings go to HUD. The savings from the project, which cap the amount that the housing authority can receive for additional subsidy, would be equal to the difference between the old utility allowance and the revised allowance

Because there is no change in the calculation of operating subsidy with the additional subsidy, as there was with the frozen base incentive, there is no "unfreezing" of the baseline. At the end of the additional subsidy period, there is no need to continue to track savings from the project, and the baseline becomes moot.

As with the frozen base incentive, the process of revising the utility allowances for calculating tenant rent must be done carefully, to ensure that they are set accurately. The savings potential of measures are overestimated and allowances are adjusted too low, the tenants will be responsible for excess use charges, when in reality the conservation measures are not performing as predicted. This ends up passing unearned savings on to HUD at the expense of the tenants. The housing authority benefits by having its additional subsidy cap set higher than it should, passing the burden of non-performing measures from the housing authority to the tenant.

Financing Methods

Financing for a project can be obtained from a number of sources. Since there may be no ESCO involved, the housing authority may end up arranging its own financing.

Several types of financing are appropriate for the additional subsidy. These include tax-exempt bonds, general revenue bonds, tax-exempt lease-purchase agreements, low-interest loans from utilities, loans from conventional lending institutions and loans from state or government agencies. (See the "Financing" discussion in Chapter 5 "The Frozen Base Incentive" for more information on these options.) Because the housing authority may be arranging its own financing, without the help of an ESCO, their choices for

financing vehicles may be more limited. The interest rates paid may also be higher. ESCOs usually arranged financing through a third party financier, who shops a national network of contacts for the best financing package available. A housing authority's more limited search may lead to a higher rate. On the other hand, some housing authorities have shopped their proposal around a number of local banks and obtained extremely competitive rates.

Remember, as with the frozen base incentive, it is vitally important to shop for the lowest interest rate possible. The difference of a percentage point or two may determine whether a package of measures will be cost-effective or not. Although interest rates for loans under the additional subsidy may be higher than those for a performance contract, some or all of that difference may be made up from not having to pay any ESCO fees, nor fees for a savings guarantee.

3. Pros and Cons of the Additional Subsidy Incentive

As with the frozen base incentive, there are several levels of decisions to make before determining that the additional subsidy is the right route for a housing authority. Once it is determined that the HA wishes to seek non-HUD financing for a project, a key decision is whether to pursue a performance contract. If the housing authority decides to use a performance contract, the question of which incentive to use is put off until the energy services negotiations. But if it decides to manage the project itself, it must use the additional subsidy. (See Unit 3 - "Decision: Which Method to Use?" for a deeper discussion of this process.) Outlined below are some of the characteristics of a project using the add-on subsidy, a review of which will help in making the decisions listed above.

For additional subsidy projects that use a performance contract, please also see the discussion under "Pros and Cons of the Frozen Base Incentive" in Chapter 5 for additional factors to consider that are specific to performance contracting. The discussion below deals with any project funded by the add-on, whether using performance contracting or not, unless specifically stated otherwise.

Advantages of the Additional Subsidy

- **Increases funds available to the housing authority:** By allowing the use of non-HUD funding for conservation projects, the HCDA of 1987 enlarges the pot of funding available to housing authorities. If there are more projects than the modernization budget can support, the HA can access private capital and not be forced to chose between resource efficiency improvements and other capital needs. Even in cases where the housing authority manages its own project and savings fall short, the housing authority still has tapped sources of funds that it couldn't have otherwise utilized. Of course, to avoid financial hardship, the housing authority must have funds available from sources it is authorized and financially able to tap to pay for such shortfalls.

- **Requires no up-front capital.** As with the frozen base incentive, the potential to use savings to repay a private loan now allows housing authorities to enter into long-term financing agreements. Although a performance contract with a guarantee of savings is not necessary, it does help protect the housing

authority if savings are not achieved.

- **Ease of financing:** Although the savings to be realized can be significant, arranging private financing for a large conservation project in public housing was restricted in the past. Now with regulatory changes and the process where HUD will increase the operating subsidy to cover the amortization of a loan, it may be easier to obtain private financing for projects than it was prior to the enactment of the HCDA of 1987. Lenders are especially attracted to projects where the additional subsidy is the reimbursement method, although there is some dispute among tax counsel at some lenders have raised issues of whether such projects should be eligible for tax-exempt leasing.

- **Increases the value and functionality of housing:** Similar to the frozen base incentive, when modernization funds are insufficient to cover all of the capital needs of the housing authority, the add-on allows the tapping of private capital. Capital improvements such as a new boiler or heat pump, additional insulation or upgraded heating and cooling controls add to the value of the property, as does the increased energy efficiency. Tenant comfort is also often improved.

- **Shorter lead time:** Because the additional subsidy does not require that loan payments be dependent on savings, the housing authority may opt not to use a performance contract. In these cases, arranging a project using the additional subsidy requires less lead time than that needed for one using the frozen base incentive, where a performance contract is required. In cases where the need for new equipment or repairs is immediate, the additional subsidy may be more practical.

- **Less paperwork:** If the additional subsidy does not involve an ESCO, there is no need to prepare, distribute or evaluate a Request for Qualifications. However, the project will still need HUD approval prior to implementation, and the savings must be calculated annually.

- **Lower total project costs:** In cases where no ESCO involved, the costs that would be incurred if using one for a performance contract, such as its overhead in planning the project, arranging financing and monitoring the project after construction, are avoided. On the other hand, many of these activities will have to be done by housing authority staff. So much of the decreased expense is merely a shifting of those costs from consulting to labor costs. Additionally, the money saved by not paying for a savings guarantee must be balanced against the increased risk borne by the housing authority, on whose shoulders it falls to ensure that savings cover the debt service.

- **Cost of the energy audit:** There is no requirement for an energy audit, so this cost may be avoided, if not using an ESCO. This is highly unwise, though, because the housing authority must be absolutely certain that the measures it chooses will pay for themselves. If they do not pay for themselves, the housing authority's operating subsidy for the following year will be decreased. Because of this, it is best to have a thorough audit done of the buildings to be retrofitted.

Disadvantages of the Additional Subsidy

There are a number of disadvantages to the additional subsidy. These include:

- **Treatment of savings:** With the additional subsidy, the rolling base is not frozen, so the housing

authority doesn't capture any more savings than it would have traditionally using the standard PFS incentives. (See Chapter 4 for a discussion of standard PFS savings.) Because HUD regulations allow a housing authority to keep 100% of the savings that are generated by a project using the frozen base method, for the life of the financing, it may be better to go this route than the additional subsidy. On the other hand, the housing authority does not have to repay their debt service out of the savings they do retain – they receive additional operating subsidy for this. Cash flows from the various incentives and factors to consider when determining which route is best for a particular housing authority are discussed in Chapter 9, "Making the Decision".

- **Risk:** HUD requires that the savings must meet or exceed the payments for the debt service every year. If there is no ESCO providing a savings guarantee, the entire burden of risk for the project not performing to expectations falls on the housing authority. If HUD will not allow a floor rate to be used when calculating savings from the add-on subsidy, the housing authority also assumes the rate risk of the project. There are contractual and regulatory limits on what money can be used to pay for these loans if there is a shortfall. Only savings and non-HUD funds may be paid to repay these private loans. This can severely limit a housing authority's options in the case of a shortfall. (HUD Form 53012A, Annual Contributions Contract, Part A, July 1995). Because of these risks it is often best to use a performance contract when doing a conservation project.

- **Standard procurement rules:** When financing a project without using a performance contract, the housing authority must follow standard procurement processes, not the streamlined method used for performance contracting. This can add time and risk. The lowest bidder may not be the best alternative when trying to make sure that savings meet expectations.

- **Project management:** The housing authority, rather than an ESCO, may be responsible for all phases of the project – design, financing, construction management, troubleshooting and monitoring savings. This can take a significant chunk of housing authority staff time.

4. Summary

The additional subsidy is a valuable option in the variety of incentives HUD allows for funding conservation projects in housing authority properties. The biggest differences between it and the frozen base method are: 1.) how the housing authority is reimbursed for the project costs, and 2.) that the housing authority does not *have* to use an energy services company, although it may want to seriously consider that option to shift risk away from itself. Unit 3, "Decision: Which Method to Use?" helps you decide where to go from here. If using a performance contract with the additional subsidy, refer to Unit 4, "The Performance Contracting Route" for more details on implementing this type of project.

CHAPTER 7

THE RATE REDUCTION INCENTIVE

Utility bills are a function of two components: consumption and the cost per unit of the resources being consumed. The HCDA of 1987 makes provisions to encourage shopping for better rates, in addition to the incentives to lower consumption that were previously discussed. Some buildings may have relatively low consumption – where conservation measures would be difficult to get results – but still have high bills due to high costs for energy or water. In these cases, the rate reduction method may be the best course to pursue.

With the advent of deregulation in the gas and electric industries, there are more opportunities for lowering the cost of utilities than ever before. In order to understand the opportunities available for decreasing utility costs through shopping for better prices, it is helpful to understand the process that brings utilities to the buildings. In addition, it is important to be aware of all of the components that make up charges on a utility bill.

1. Regulated Utility Primer

Deregulation

Much of the natural gas industry was deregulated with FERC Order 636 in November, 1994. The distribution of natural gas within a state is still regulated by state public utility commissions (also known as public service commissions, state corporation commissions and other similar titles). In most localities, though, commercial and industrial customers (as determined by the volume of gas consumed) can purchase gas from an independent **broker** or **marketer**, using the **local distribution company (LDC)** only to deliver the gas. This is known as **transporting gas**. Some areas are now piloting programs to allow residential customers to choose their gas supplier too, but at the time of publication, this is still of scattered availability.

Deregulation of the electric industry is proceeding on a state-by-state basis. There is the potential for federal action that would deregulate the industry nationwide, but this has not yet occurred. The analog for electricity to transporting gas is "wheeling." **Wholesale wheeling**, authorized by the Energy Policy Act of 1992, opened access to the electric grid so utilities could sell excess power to other utilities. Wholesale wheeling is not relevant to most housing authorities, although at least one housing authority known to the authors is pursuing purchasing electricity from an alternate supplier using wholesale wheeling. **Retail wheeling**, on the other hand, enables utility customers to purchase electricity from someone other than the local utility. At the time of publication, about 10 states have passed legislation allowing retail wheeling, and a few pilot programs are beginning in California, New England and elsewhere at the time of publication. If your state has retail wheeling, you may be able to reduce your costs by purchasing electricity from a third party.

With deregulation, the market has become **unbundled**. Before deregulation, the gas or electric company provided a "bundled" package of services, including everything necessary to bring the utility to the building. With unbundling, each of these services can be purchased separately, so a customer (or a customer's representative, such as a broker) can shop for the best prices available for each component. The options

available vary significantly from area to area. Shop around to find out what options are available to your housing authority.

Natural Gas

The process of getting natural gas from the ground to the **burner tip** is more complicated than many people realize. Once the gas is located and extracted by a producer, it is transported to the local distribution company by a **transportation company**. The local distribution company delivers it to the consumer. Due to the seasonal nature of natural gas usage, it is often extracted at times of low demand and stored until it is needed.

Prior to deregulation, the transportation company would buy the natural gas from the producers, the local distribution company would buy it from the transportation company and the customer would buy it from the local distribution company. Since FERC Order 636, the transportation company simply moves the gas. It is the distribution company's responsibility to purchase the gas from the producer. And it is possible for a housing authority to bypass the distribution company as well. They can purchase gas directly from the producer, using a broker, or purchase the gas from a marketer. In these cases, the distribution company simply delivers the gas that the housing authority purchases through a third party.

Electricity

The ease of flipping a switch to turn on an electric appliance belies the complexity of the process involved with getting the electricity to that switch. It is similar to the process by which natural gas is delivered. Electricity can be generated by a number of methods ranging from large nuclear or coal-fired plants to small, home-based solar or wind generation. There are numerous power producers in the business, including independent producers and utility-owned production facilities. After electricity is produced by the generation company, a transportation company delivers it to the local utility, which is known as a distribution company. The distribution company delivers it to the end customer. There are no widely used methods to store electricity, so it is more sensitive to changes in demand than natural gas.

Utility Charges

With both gas and electric usage, the utility bill total is composed of a number of parts. Some of these are dependent on the amount of fuel used while others are not. The fuel-based costs include a **fuel charge** and a **meter rate**. The fuel charge is based on the actual amount the utility had to pay for the gas or electricity the customer used. They are not allowed to make a profit on this portion of the bill and must simply pass through their costs to the consumer. Generally, it is this portion of the bill that a housing authority may reduce by going to a broker or marketer. Energy is purchased from a variety of producers and is bought using short- and long-term contracts, as well as spot markets. A savvy marketer or broker may be able to offer a lower fuel cost than the local utility, even though the utility isn't marking up their costs at all.

The meter rate covers the utility's cost of providing service. Often times, this rate will vary in what are called **blocks** or **steps** – i.e. the usage is billed at one rate up to a certain limit, after which another rate kicks in. It includes such things as operating expenses, taxes, depreciation and the company's allowed rate of return.

Other charges include a **meter charge** or **customer charge, demand charges** and **reactive charges**. The meter charge is a flat rate assigned to each meter. It is generally set to cover the fixed costs of servicing the customers account, such as meter reading, and therefore does not vary with the volume of resource that is used.

Demand charges are based on the amount of capacity the utility must have to service that customer. In the case of a natural gas company, for example, capacity depends on how much pipeline space must be reserved (MCF capacity vs. MCF). For an electric company, capacity depends on how much generation and line capacity is needed (KW vs. kWh). This charge is based on **peak demand**. On the hottest day of summer, or the coldest day of winter, the utility may meet restrictions in the amount of its product that it can deliver. Demand charges serve to encourage consumers to shift their usage away from peak times, and also to reimburse the utility for any extra capacity it needs to build.

Reactive charges are specific to electric utilities. They are charges to a user of electricity whose equipment introduces wave distortion (harmonic shifts) into the power system. The "normal" power factor for an account is 0.85; power factors less than that are considered low and need correction. The perfect power factor is 1.0. Inductive loads are the source of power factor problems. Large motors are the largest contributor to power factor problems. Large air handler motors, compressor motors, cooling tower motors and pump motors are the usual problem source in large commercial and industrial buildings; especially those with variable drives. Fluorescent lamp ballasts are a minor contributor to power factor problems relative to motors. Resistive loads have a power factor of 1.0 and are not a contributor to power factor problems. Power factor problems are corrected by installing capacitors on the incoming power lines. They "dampen" the wave distortion. There is no rule of thumb to capacitor power factor correction; although the higher the load, the more capacitance is needed to correct the problem. When considering conservation retrofits, the affect of the measures on alleviating or exacerbating power factor problems, and the associated charges, should be considered. (Heiss, 1998)

Rates charged are also differentiated depending on whether the customer wants **firm** or **interruptible** service. With firm service, the customer is contracting for service at all times, even during peak usage periods such as very hot or cold weather. This requirement means the utility must be sure to have enough capacity and commodity to serve the customer during these peak periods. Consequently, the rate charged for firm service is generally much higher than that charged for interruptible service. With interruptible service, the utility may issue **curtailment** notices during periods of peak demand. During these periods, interruptible customers must stop using that fuel source in order that the utility may have enough capacity and product to serve their firm customers. This increase in price may affect both the meter rate that is charged by the local distribution company and the price per unit of energy when going through a marketer. In both cases, the added charge is due to higher costs during times of peak demand and to charges for reserving transportation and distribution capacity.

Utilities usually require “human needs” accounts, such as residential heating, to contract for delivery using firm rates. This may negate the savings that are available by purchasing gas or electricity from a broker or marketer. A strategy to avoid having to pay the higher tariff is to utilize heating plants with dual fuel capabilities, so that, for instance, a boiler could be switched from gas to oil during curtailment periods.

The above rates are based on the amount the local public utility commission has determined is fair and reasonable. The rates vary depending on the customer's class of service, which is generally determined by the volume of energy they purchase. Rates are published in what is known as a **tariff**. When a utility has a rate case, the tariff is what is being determined. And when a utility speaks of its "rates" increasing or decreasing, it is only talking about these portions of the charges – not the fuel charge. Generally, these rates are non-negotiable. But the tariff can sometimes be negotiated down in the case of a large customer with a choice of an alternative fuel or provider, where the utility is worried about losing the business altogether. In these cases it is possible for a housing authority to reduce costs in two ways: reducing the fuel charge by buying from a marketer and reducing the tariff charged by the LDC for delivering the energy.

As deregulation proceeds, the relative proportion of these rates' contributions to the utility's bottom line may change. This is important for housing authorities, especially if more costs are shifted from volume-dependent rates to fixed-rates, like meter charges. It could impact the utility costs of housing authorities and their tenants if there are a large number of individual meters in their complexes.

2. Non-regulated Utilities

In most states fuel oil and propane are not regulated by the state public utility commission. They are sold on the free market. If your housing authority uses these fuels, you may bargain for a better price with your local distributor. Because there are no published, regulated rates for these fuels, trying to document savings to take advantage of HUD's rate reduction incentives may be difficult.

3. Fuel Conversions

In some instances, there is the option of changing over from a high cost fuel source to a lower cost option. Fuel conversions involve capital intensive retrofits, and this makes them good candidates for using the frozen base or the additional subsidy in order to cover the capital investment. Changing fuels is not mentioned specifically in relation to these incentives, although there is guidance on establishing the AUCL for a project that has "experienced conversion from one energy source to another outlined in 24 CFR 990.107 (c)(3)(B). Because of the lack of direct regulatory guidance, any project that involves changing from one energy source to another will mostly likely need to go to HUD's Washington, D.C. offices for a waiver.

4. Guidelines for Using the Rate Reduction Incentive

HUD regulations spell out specific criteria that a project using the rate reduction method must meet [in 24 CFR 990.107(b)(2)]. The HUD requirements are outlined below.

Action outside normal participation in rate-making procedures: In order to keep the savings from the reduction in utility charges it negotiates, the housing authority must take steps beyond participating in a rate case. Examples such as this would include purchasing gas or electricity through a third party, or negotiating individually with the utility for a lower rate than the published tariff for their rate class. At the time of publication, it is unclear whether rates that are reduced through switching to a lower cost fuel, as part of a performance contract, will fall under the rate reduction incentive, or whether the housing authority can use

the frozen base to keep 100% of the savings for the length of the contract. (See Chapter 15 for details on how to structure this type of arrangement)

Level of retained savings: The housing authority is allowed to keep 50% of the savings it negotiates. The other half goes to HUD. In the past, any change in cost per unit for utilities was factored into the computation of utility reimbursements. This resulted in HUD keeping 100% of any reduction in rates.

HUD will not automatically give the 50% of the savings to the housing authority. *The housing authority must demonstrate to HUD the amount of savings it has negotiated*. This can be done by comparing the fuel charge and rates with the local distribution companies' fuel charge and published tariff. (Note that the tariff is public record and the utility should be able to provide it to the housing authority. If the utility is resistant, the tariff can be obtained from the state public utility commission.)

Length of retained savings: There is no limit to the period of time during which the housing authority may claim this type of savings, as long as the housing authority can continue to demonstrate them.

In addition to HUD requirements, there are a number of other factors to consider.

Types of projects: In general, projects with high utility rates are most suited to utilizing the rate reduction method. If a project has both high consumption and high utility rates, it is often advisable to address the conservation measures first, assuming it is possible to obtain a floor rate from HUD. Decreasing the level of consumption makes the housing authority less susceptible to fluctuating prices in the future. If the housing authority wants to use a performance contract to make conservation improvements in the future, decreasing the rate paid prior to signing the contract will decrease the potential savings. Decreasing the rate may also make some measures that would otherwise have been cost-effective into measures that are not so.

5. Pros and Cons of the Rate Reduction Method

Advantages of the Rate Reduction Method

- **Retain 50% of the savings:** The housing authority may keep half of the saving it negotiates from decreased utility charges. This money can help supplement other work that needs to be done to housing authority properties or pay for projects such as anti-drug programs.
- **Speed of Implementation:** This is the quickest method for realizing savings from decreased utility costs.
- **Less paperwork and staff time:** Although there is some legwork to be done by housing authority staff, in general, this approach is the least burdensome for housing authorities to implement.
- **Method for addressing high-cost buildings with low consumption:** Without this option, housing authorities would have no options for retaining savings if their buildings were efficient, but still expensive to operate due to high utility charges.

Disadvantages of the Rate Reduction Method

- **Purchasing is complex process:** In order to navigate all of the options and make the best deals possible, it is best to have staff knowledgeable about utility purchasing in a deregulated market. In lieu of hiring staff, it is possible to hire a consultant or rely on a reputable broker or marketer.

- **Risk:** It is possible to end up paying *more* for energy if the purchasing contract is not set up with proper protections for the housing authority. If the housing authority does not have in-house staff with expertise in these areas, it may be wise to seek outside help when writing an RFP or setting up a contract for an alternative energy supplier.

- **Paperwork:** Although the paperwork is much less involved than other methods available under the HCDA of 1987, there is some. The housing authority must be able to demonstrate that it is paying less than if it was purchasing directly from the local utility. This may involve tracking down current tariffs from a resistant utility, or contacting the local utility commission. Also, the housing authority may need to issue an RFP for services from a broker or marketer (See Appendix E for a sample RFP and Chapter 9 for a discussion on what to include in the RFP.)

- **Decreased savings from performance contracts and the additional subsidy.** If a housing authority negotiates cheaper prices for fuel before implementing conservation projects, the potential savings attributed to the conservation project will be decreased. (See Chapter 5, "Introduction to Performance Contracting" and Chapter 6, "Introduction to the Additional Subsidy" for discussions on the impact of rate changes on these methods.)

6. Summary

The advent of utility deregulation has made the rate reduction method an even more valuable option for buildings where utility costs are high but consumption is low. Because negotiating for better prices is often easier if the customer consumes large quantities of energy, housing authorities may want to consider retaining master meters for their utilities. Caution should be exercised in utilizing this option if conservation measures are being considered in the near future. If a lower-cost fuel option is available, a fuel-switching retrofit should be considered as part of a performance contract or additional subsidy conservation project.

UNIT 3. DECISION: WHICH METHOD TO USE?

Planning and implementing a conservation or rate reduction project using the incentives of the Housing and Community Development Act of 1987 can be complicated and entail a considerable amount of staff time. But if done well, many parties can benefit from a source of funding – decreased utility bills – that would normally remain untapped. The scope of the projects that can be undertaken, and which might remain undone otherwise, can make the investment of time well worthwhile.

Chapter 8 outlines the steps to gather data and prepare for making the decision of which course - modernization funds, performance contract or rate reduction; frozen base or add-on subsidy; or a combination of several - is right for a particular housing authority. Chapter 9 discusses the factors that should be considered in that decision-making process.

CHAPTER 8

PREPARING FOR THE DECISION

In order to choose the course of action that is most beneficial to a particular housing authority, it is of the utmost importance to evaluate the potential benefits of each of the possible options for decreasing utility expenditures available under the HCDA of 1987. Energy performance contracting for conservation retrofits, in particular, may require many hours of staff time and large amounts of money to be invested in project preparation and implementation. So it must be determined that a conservation retrofit is a wise course of action before investing too many resources into the project. Once the decision to pursue a performance contract is made, appropriate steps must be followed to ensure the housing authority's interests are protected. The successful completion of the performance contract depends on it.

This chapter outlines the steps that should be taken to help decide if conservation retrofits make sense, including performing a preliminary fuel- and water-use audit and assembling a team to manage the project. If a retrofit is indicated, then the next step is choosing what type of incentive is the right vehicle for financing the project.

1. Perform the Fuel- and Water-Use Audit

In determining whether to pursue conservation options under the HCDA of 1987, the housing authority should acquire and analyze fuel- and water-use data for each building. Through this preliminary audit, it is possible to tell if the buildings are using enough resources to warrant taking further steps – without ever setting foot in a building. This is a low-cost way to understand which buildings merit an investment of time and money versus those which will not give a good return on investment. If resource use is not high enough to merit pursuing conservation measures, the housing authority may still be able to save significantly on its utility expenditures by pursuing alternative methods for purchasing energy. (See Chapter 7) It may be

possible for the housing authority to perform this preliminary audit itself, or it may hire a consultant to help. (See "Where to Go for Fuel Analysis Services" below.)

The preliminary fuel- and water-use audit is critical for several financially important reasons. With performance contracting, the housing authority is liable for the costs of any energy audits an ESCO performs, if the housing authority decides not to progress with any further work. This can be true even if the decision not to continue is because no cost-effective measures are available, depending on how the RFP and Audit Agreement are designed. These audits can cost anywhere from $35 to $150 or more per unit, depending on the complexity of the buildings and the size of the conservation project. Because of this expense, it is vital to send out RFPs only in cases where there is definitely potential for savings through conservation. If a housing authority uses the additional subsidy method, without an ESCO the housing authority's operating subsidy may be cut by any shortfall in projected savings. So the housing authority must be sure that savings potential is truly there before launching a project.

Past audits performed on the properties can also supplement the information obtained through the preliminary fuel-and-water-use audit.

Methods for Analyzing Resource Use

Sophisticated computer modeling tools can analyze energy use in a building and adjust the data to account for impacts on fuel use due to differences in climate from one area to another, changes in the weather from year to year, and the size of the building. These tools can be used to look at fuel use in one building, or a set of buildings. The analysis can be done for a point in time, e.g. how much energy did my building use last year?, or over a period of time, e.g. how much energy did my building use this year compared to last year? For this preliminary audit, an evaluator will use the models to examine current energy use in the buildings being considered for retrofit work. If conservation measures are installed, these fuel-use programs can also be used to track the savings by comparing pre- and post-retrofit fuel use.

When a housing authority looks at the fuel and water use at their properties, it is important for them to have a benchmark to compare against. Benchmarks for energy use may be set up in units of "Btus of energy used, per square foot of building area per **heating degree day (HDD)** or **cooling degree day (CDD)"**, "dollars per square foot", or "Btus per square foot". All of these units normalize the energy used (or energy cost) by dividing it by the size of the buildings. In this way, the fact that a larger building should be expected to use more energy than a small one is factored in. Btu/sf/dd also standardizes for climate. Water use can also be normalized by looking at gallons/unit or gallons/person.

Heating and cooling degree days are summary measures which compare the average daily temperature in an area to a baseline temperature, usually 65 degrees for HDDs and 75 degrees for CDDs. These baselines are chosen as representing the temperature at which heating or cooling equipment will be needed. For example, if the average daily temperature were 45 degrees, that day would have 20 heating degree days. If the average daily temperature were 25 degrees, the day would have 40 heating degree days. The number of HDDs and CDDs over a year are added together to arrive at an annualized measure. The more heating and cooling degree days there are for an area, the more extreme the weather. They indicate relative amounts of fuel that will be needed in a building as weather changes. They are used here to normalize fuel

use for variations in weather and climate when determining the possibility of decreasing consumption through conservation.

A first step in benchmarking is to compare buildings across the HA's portfolio. Find out which buildings are using more energy and water than others at your housing authority. It is also important to compare to an overall benchmark, if possible. All of your buildings may be higher (or lower) than average energy and/or water users. Comparing against regional or national data can help you determine this. Through analyzing numerous buildings, NCAT developed a standard for classifying high, medium and low energy and water users. (Hayes, 1998) (See Figure 5.)

Figure 5. Ranges of Utility Use

Ranges of Utility Use	Baseload (Btu/SF/DD)	Heating/Cooling (Btu/SF/DD)	Total (Btu/SF/DD)	Water Gal/Unit/Day
Low	Below 5	Below 10	Below 15	Below 71
Medium	5 - 8	10 - 13	15 - 21	70 - 90
High	Above 8	Above 13	Above 21	Above 90

Determining where a building falls in these classifications can help identify the potential for savings from conservation measures, but it must be remembered that these rankings are only guidelines. There are many factors that affect energy use in a building. The classification system in Figure 5 attempts to get at a first cut of whether there is potential for conservation savings. There is no "right" answer, no absolute cutoff point in energy and/or water use below which a conservation project doesn't work and above which it does.

It is best to compare your buildings' data to several benchmarks. The more information you get that points in the same direction, the more confidence you can have in your assessment of the potential for savings. Work with your closest Federal Department of Energy or State Energy office to get other benchmarking data, perhaps derived from buildings in your region or type of occupancy, such as whether the buildings have families or elderly tenants. You can also ask the ESCos that have expressed an interest in bidding on the job what benchmarks they use to help "pre-qualify" buildings.

Remember, too, that the quality of the fuel and water use data you use is extremely important. Variations in meter accuracy, completeness of billing data, etc. can greatly affect the reliability of your analysis.

Computer Evaluation

Computers can help evaluate fuel use data. Some programs can be used to model individual buildings and project what their energy use will be if various conservation retrofits are installed. It is this type of computer program that an ESCO will use when performing an energy audit and when recommending specific energy

conservation measures. These programs predict energy use based on engineering estimates of the physics of heat transfer in a building. Another type of program analyzes actual fuel use. This type of program looks at the actual utility usage and normalizes it for weather, among other things. It provides statistical measures that help an evaluator determine whether the input data, and therefore the output, is reliable.

The **Princeton Scorekeeping Method (PRISM)**, first released by Princeton University in 1986, is one of the computerized fuel-use modeling programs. The version of PRISM that was released in 1995 makes it easier to allow for estimated readings and inaccurate data. Through statistical analysis of the fuel-use data, PRISM can break up energy use into heating, cooling and baseload use. Baseload is energy use that is not dependent on the weather, such as that used for lighting, domestic hot water and household appliances. PRISM will also normalize the fuel use for the weather experienced during the period under evaluation, producing a measurement called Normalized Annual Consumption (NAC). NAC is the amount of fuel the building *would have used* if temperatures over the heating or cooling season had been "normal" – Normal is determined by averaging the temperatures experienced in the area over a number of years, usually 30.

This breakdown of where energy is used can help the housing authority and ESCO to determine where the most likely conservation retrofits lie. A building with high baseload and low NAC will require very different conservation measures than one with a low baseload and high NAC.

Data Needed

The housing authority will need to provide energy and water consumption data for the entire building, including common areas and tenant occupied areas. For this preliminary audit, it is important to have at least 12 months, preferably 24 months, of past consumption history, complete with meter read or fuel delivery dates. If the analysis indicates that a conservation project is warranted, 3 years of data will be needed for establishing baseline utility use and freezing the rolling base, so it is wise to gather as much data up front as possible.

Consumption is the amount of energy used – for instance, kwh of electricity, or therms of gas – not the dollar amount spent. In addition, information is needed on building size, use and occupancy. Weather data can be obtained by the evaluator from climate data sources and doesn't need to be provided by the housing authority.

Cautions When Using Computer Tools

There are some difficulties involved in utilizing computerized fuel-use programs such as PRISM. Historical weather data for an area is generally only available from the nearest airport weather station, and the weather at the site of the building being analyzed may vary significantly. Missing or inaccurate utility information can also affect the accuracy of results. A computer analysis is only as good as the data fed into the program — good clean data is essential if the analysis is to accurately characterize a building's energy use and potential conservation savings. See Appendix L for a discussion of statistical measures to examine when evaluating the accuracy of the data produced by PRISM.

Where to Go for Fuel Analysis Services

There are a number of options available for obtaining fuel use analysis. Some ESCOs will evaluate fuel use as part of their response to a Request for Proposals (RFP) issued for performance contracting. Unfortunately, due to the time involved in preparing an RFP, it is best to evaluate fuel usage and the potential for conservation *before* issuing an RFP. A housing authority may hire a consultant with experience evaluating savings from energy programs such as the Low Income Home Weatherization Assistance Program (HWAP) and utility demand-side management programs. The National Center for Appropriate Technology also provides fuel use analysis services for public and assisted housing. If the analysis indicates potential for conservation, and the housing authority decides to pursue a conservation project, these costs can be rolled into the project costs and paid for through the conservation financing, allowing the authority's CIAP/CGP funds to be reimbursed.

2. Assemble the Project Team

Once it has been determined that enough savings potential exists to warrant pursuing energy conservation measures, the next step is to put together a team to work on the project. Start by choosing a project manager who will take responsibility for coordinating and managing the project at least through the planning and ESCO-selection processes, if applicable. This person will draw on the expertise of the others on the team.

There are a number of subject areas that are important to cover when choosing team members. These include energy conservation, project management, finance, facility and operations management, legal matters, and procurement policy. Technical advisors and consultants, as well as HUD Field Office representatives may also be included on the team.

One of the project manager's first responsibilities should be to contact the HUD Field Office to let it know the housing authority is considering using a conservation project using the incentives from the HCD of 1987. For larger housing authorities, it might even be worth hiring a staff person to deal specifically with energy matters.

Hiring an Energy Manager

The supply and conservation of energy is a complex and ever-changing field. The staff of a housing authority often does not have the time nor the expertise to keep abreast of developments in energy conservation, use and procurement. Keeping track of energy efficiency options, fuel prices and utility billing for a large housing authority is a technical and demanding job. Hiring a full-time energy manager with experience with multifamily housing, ESCOs, HUD procedures and utility deregulation is a good investment for most larger housing authorities.

An energy manager's responsibilities typically include coordination of conservation activities between staff, residents and government agencies; keeping up to date on energy-management issues, techniques and opportunities; fuel-bill monitoring; and energy audit oversight. The energy manager plays a lead role in the

development and acquisition of contracts for conservation improvements to housing authority properties and in monitoring energy consumption. And as the natural gas and electric industries deregulate, there will be even more opportunities for managing utility expenditures through **gas transportation** and through **retail-wheeling of electricity**.

Case Study

The Chicago Housing Authority (CHA) hired an energy specialist in January, 1993. He had spent the previous eight years administering energy purchases and energy-management programs for the Chicago public school system, which was the largest customer of the local natural gas utility, People's Gas. While with the school system, he had negotiated a gas-storage agreement with the utility that saved the school system a substantial sum.

The new energy manager's first undertaking at CHA was to negotiate a similar arrangement for the housing authority, which, with more than 56,000 apartments, was the gas utility's second largest customer. The utility agreed to store more than one thousand MMCF at no cost to the housing authority. The storage capability made it possible for the housing authority to purchase natural gas when rates were low and to use gas from storage for heating when gas rates were high. The storage system saved CHA $10 million in 1993 and $12 million in 1994. Savings have decreased since that time due to fluctuations in the price of natural gas and changes in gas company billing procedure. The manager also instituted a periodic audit of utility bills to ensure that the housing authority was being charged correctly — an action that saved $525,000 during 1993.

CHAPTER 9

MAKING THE DECISION

After the housing authority has assembled the project team and gathered the necessary data for making a well-informed decision, it is time to chose which route to pursue to decrease the housing authority's utility expenditures. If the energy and/or water use is low, but expenditures are high, negotiating rate reductions is the best course. (See Chapters 7 and 15.) If consumption is high, a conservation project may be worthwhile.

When a conservation project is determined to be feasible, the next step is to evaluate the options available for funding. These include spending modernization funds and using the standard PFS method, or arranging a loan from a non-HUD source and using the frozen base or the additional subsidy incentives. The team also must decide whether to use a performance contract or administer the project with housing authority staff. To make these decisions, a number of factors should be considered. These include the availability of modernization dollars, investment of money and staff time and risks for each option and savings retained by the housing authority.

Availability of Modernization Dollars

A substantial part of the decision of which funding option to use is whether there are sufficient modernization dollars available to do the conservation work that the housing authority desires. If money is available from this source, the housing authority should give serious consideration to using it on the conservation project. If the existing pot of modernization dollars is insufficient to cover all of the housing authority's capital improvement needs, they may want to consider borrowing private capital and using the frozen base or add-on subsidy incentives.

Staff Resources and Project Timelines

Some of these methods are more time consuming for housing authority staff than others. The project team should factor the resources that will be needed from the housing authority into its decision. The standard PFS method uses existing procedures and should not require any more staff time than would normally be allocated to a project of this type. The rate reduction method requires staff to document the decrease in rate, to investigate alternative utility suppliers and negotiate contracts.

For the additional subsidy, staff must project savings and determine a cost effective measures package, or they must go through the process outlined below to enter into a performance contract with an energy services company. If doing the work themselves, staff members must document their savings projections and rationale behind the selected measures to obtain HUD approval for an additional subsidy. Staff are responsible for arranging the project financing and managing the construction. Every year they will need to gather consumption information and demonstrate that actual savings met or exceeded predicted savings.

If using the frozen base, or an ESCO with the additional subsidy, some of the roles mentioned for staff above are taken over by the energy services company. But the process of securing an ESCO can be time consuming in itself. And hiring an ESCO introduces another party to the project, which can add time and complexity. Chapter 10, "Choosing an ESCO," outlines this process and the responsibilities of housing

authority staff in performance contracting.

The time needed to implement a project varies with each incentive. The rate reduction method can be done relatively quickly. Conservation projects, being capital improvement projects, take longer. Of the three options for financing conservation retrofits, the standard PFS is the quickest, in that it uses the same protocols as any other modernization project and no documentation of savings are needed, beyond the filling out the 52722-A and -B forms in the same manner they are normally completed. Energy performance contracting, whether done with the add-on subsidy or the frozen base incentive, has the longest timeline due to the many steps involved. It is not suitable for projects needing an extremely quick turn around.

Risk

Standard PFS Method

When a housing authority is debating which route to pursue for decreasing utility costs, there are a number of risk points to be considered. The standard PFS method may be least risky, in terms of the exposure a housing authority has from a project. But there is the other side of risk – that of not being able to afford to do all the work that could be done for facilities improvements. If modernization funds are used for energy projects, it may be at the expense of other work that could or should be done. With privatization, not taking advantage of every opportunity available to improve its properties could be costly to a housing authority. In a privatized world, if facilities don't measure up, tenants may move to more favorable living quarters. If the housing authority decides against addressing needed energy measures, it is paying money to a utility company when it could be paying a loan for improvements to its facilities (and pocketing some of the savings as well).

The Additional Subsidy

If the housing authority chooses to do the conservation project using the additional subsidy incentive without using an ESCO to guarantee the savings, they assume the risk of the project performing as predicted. If the measures don't perform, the housing authority still must pay its loans, and there are contractual and regulatory restrictions on what source of funds may be used for this purpose. (HUD Form 53012A, Annual Contributions Contract, Part A, July 1995) The amount of the additional subsidy will be decreased in any years following a shortfall between actual savings and the amount of the debt service. Housing authorities are also at risk for changes in rates with the additional subsidy, unless HUD allows them to stipulate a floor rate for calculating savings over the years. Even if the retrofit measures perform as predicted, the dollar value of the savings may be eroded by falling utility rates to the point where the savings do not cover the amount of the debt service. At the time of publication the, the authors are unaware of any cases where a HUD floor rate has been used with the additional subsidy method. If the housing authority uses a performance contract for the additional subsidy, the risks discussed below for the frozen base should be considered.

The Rate Reduction Method

In order to profit from the rate reduction method, a housing authority must be well versed in the opportunities available from deregulation in their area, if indeed their utilities have been deregulated. They must also be skilled in dealing with energy procurement contracts. These contracts vary in complexity. The simpler of these, such as contracts that stipulate a certain percentage savings below the local distribution

company price, may have little risk. More complex contracts, while perhaps yielding greater savings, can also lead to greater risk. It is possible for a housing authority to pay *more* for energy from an alternate supplier than from their local distribution company. If the housing authority or its consultants are well-versed in these issues, risk to the housing authority can be minimized. Still, savings are volatile and can not be counted on for long term income. And the housing authority can lose if it wants to do conservation later – reduced rates will lead to a smaller pot of savings to draw from. On the positive side, with the rate reduction method there is no capital expenditure and a comparatively small amount of staff time needed.

The Frozen Base Incentive

The risk to the housing authority for consumption savings not meeting predictions is mitigated in the frozen base incentive (and the add-on subsidy if done with a performance contract) by having the ESCO guarantee the savings in the performance contract. Risks from rate fluctuations may be addressed through the use of floor rates. There are risks, though, to performance contracts.

The clearest risk is that of having to pay for a high cost audit if the housing authority and the ESCO can not reach agreement on an energy services contract. A complete and thorough audit is very necessary to a successful performance contract. But because of its expense, care must be taken prior to signing an agreement for an audit, that a performance contract will be feasible. Analyzing fuel and water use before issuing an RFP will help ensure that predicted savings will be sufficient to fund a project. Another strategy for mitigating this risk is to negotiate an audit fee the housing authority is comfortable paying in the event a final energy services agreement can not be negotiated. Being clear in the RFP about what expectations the housing authority has, including potential measures, will help avoid misunderstandings down the road. Language can also be included in the audit agreement to require the ESCo to stop the audit if they determine that a cost effective project is not feasible. This encourages due diligence on their part prior to bidding on the project.

There are also risks not related to the cost of the audit. HUD has specific rules for the frozen base, and for performance contracting. It is important that the housing authority and the ESCO be very familiar with those regulations and obtain HUD approvals at every required point. This will help avoid situations where savings could be disallowed, or projects must be delayed or canceled prior to signing an energy services contract. There are also risks from weather, especially if the project will be dealing with cooling equipment. Since HUD does not allow adjusting consumption with a cooling degree factor, as they do for heating, there may be occasions where fluctuations in weather will result in consumption savings not meeting expectations. The housing authority must make sure the ESCO is aware of this and willing to guarantee savings in these situations.

It is possible that even with a savings guarantee a housing authority may not recoup enough savings from a project to pay for the financing. It is very important to evaluate the structure and backing of an ESCO's guarantee, as well as its calculations for computing consumption savings. A specific RFP, a careful evaluation of these details when selecting an ESCO, and a working knowledge of what to look for in an energy services agreement will help ensure that there are no problems meeting loan payments.

This relatively long discussion on risk inherent to performance contracting is not meant to discourage pursuing that path. The risks are greater here than in some of the other methods because it is a more

complex process. But performance contracting offers many advantages, and it may be the best alternative for a housing authority. If these risks are addressed up front, there is every likelihood of a successful project. Going into the process knowing what might be encountered will enable a housing authority to set up their strategies to avoid any problems. Unit 4 will outline in much greater detail the steps involved in implementing a successful performance contract

Net savings to Housing Authority

This may be the least important factor of those discussed. Although it is tempting to look at dollar amounts to the exclusion of all else, the "soft" issues discussed above are very important to the decision-making process. In addition, the type of retrofits to be installed, their useful life, and the desires of the HUD, the project financiers and the ESCo may be heavy influences on whether to use the frozen base incentive or the additional subsidy. As you will see, aside from the increased capital that is brought to bear when using the incentives of the Housing and Community Development Act of 1987, the variation in net savings to the housing authority are relatively small between each of the incentives. That being said, it is illustrative to see how cash flows between the housing authority and HUD for each of the methods.

It is impossible to say which method will result in the most benefit to an authority, without examining their particular situation. Much depends on what the housing authority wants to get out of the project. Does it want to use this mainly as an additional source of funding for capital improvements, or is it more focused on capturing excess savings above those needed to pay for the retrofits? Does it have modernization funds that could be spent on energy improvements without bumping another project that is needed? Are project costs small relative to projected savings or are most of the savings required to pay the debt service and annual fees?

When examining total savings to the housing authority, this manual looks at two aspects of the incentives: 1) the dollars that remain with the housing authority and 2) the value of any capital improvements that were done beyond what would have been possible using only modernization funds. Figures 6 and 7 summarize savings information from the examples that were presented earlier in the book for each method of conservation financing. All the examples dealt with a conservation retrofit financed over 10 years which saved 25% of a $1 million pre-consumption utility bill. Total project savings are defined as the gross amount by which utility bills are decreased over this time period, $2.5 million. This common period was chosen to allow for comparison between methods. For simplicity, the examples held the rate constant so that savings in consumption translate directly into dollar cost savings. Figure 6 summarizes the savings if the total project cost is $2 million. Figure 7 uses a total project cost of $2.4 million.

Figure 6. Comparison of Benefits to Housing Authority from $2 Million Project

	Pre-Consumption	Post-Consumption	Total Project Savings[2]	Project Cost = Capital Improvement Benefit	Net Dollar Cost Savings[3]	Total Benefit to HA
Standard PFS Method[1]	$1,000,000	$750,000	$2,500,000	$2,000,000	$375,000[4]	$375,000[7]
Frozen Base	$1,000,000	$750,000	$2,500,000	$2,000,000	$625,000[5]	$2,625,000[8]
Additional Subsidy	$1,000,000	$750,000	$2,500,000	$2,000,000	$375,000[6]	$2,375,000

1 Evaluated over 10 year period for comparison with the other two methods.

2 10 years at $250,000 per year savings.

3 See earlier chapters 4,5 and 6 and the footnotes below for further discussions on how this is derived.

4 = (250,000+250,000+166,667+83,333)/2

5 = Excess Savings during contract period + 50% of savings as base unfreezes: [500,000+(166,667+83,333)/2]

6 = (250,000+250,000+166,667+83,333)/2

7 Project costs are not counted in "Total Benefit to HA", as the funds did not expand the pot of capital improvement benefits to the HA

8 The HA's total benefit for the frozen base can be greater than total project savings because the HA retains 50% of the savings for 2 years after the base unfreezes.

Figure 7. Comparison of Benefits to Housing Authority from $2.4 Million Project

	Pre-Consumption	Post-Consumption	Total Project Savings	Project Cost = Capital Improvement Benefit	Net Dollar Cost Savings	Total Benefit to HA
Standard PFS Method	$1,000,000	$750,000	$2,500,000	$2,400,000	$375,000	$375,000
Frozen Base	$1,000,000	$750,000	$2,500,000	$2,400,000	$225,000[1]	$2,625,000[1]
Additional Subsidy	$1,000,000	$750,000	$2,500,000	$2,400,000	$375,000	$2,775,000[2]

1 Note that the Project Costs and the Net Dollar Cost Savings always combine to equal the Total Benefit to the HA. In this case where the is higher than in Figure 6, the Net Dollar Cost Savings is lower, but the Total Benefit to HA is constant.

2 The HA 's total benefit for additional subsidy can be greater than total project savings because the HA is allowed to keep 50% of rolling base savings, in addition to HUD amortizing loan payments up to a limit of annual savings.

Observe that the lowest total benefit to the housing authority is for the standard PFS method, at $375,000.

The net dollar cost savings are low because the rolling base isn't frozen and the housing authority only nets 50% of the savings from decreased consumption. The capital improvements benefits are counted as zero for this method. Even though work is done, it does not extend the amount of money available to the housing authority beyond its normal resources. This is not to say that the housing authority does not receive benefit from modernization funds, just that it is not a benefit beyond what they would have received from the funding formula, whether they did a conservation project or not. Neither the net dollar cost savings, nor the capital improvement benefits are dependent on the cost of the project. Benefit to the housing authority is derived solely from the savings resulting from decreased consumption.

The frozen base incentive allows a housing authority to keep 100% of the dollar cost savings from a conservation project for the length of the financing contract. There are capital improvement benefits in the amount of the project cost. The capital improvement costs have been counted in the "Total Benefit to HA" column because this project used private capital that expanded the pot of funds available to the housing authority. The savings are captured by freezing the rolling base at the pre-retrofit consumption level. Once the contract is over, the housing authority continues to accrue savings as the rolling base unfreezes. So, benefits to the housing authority will always be higher than the total savings for those 10 years. Because HUD does not increase the operating subsidy, the costs of the debt service for the project must be paid for out of the savings that are generated. The result of this is that *the total pot of potential benefits to the housing authority is defined by the total project savings plus the 3 years of retained savings as the base unfreezes*. If the project costs go up, it decreases the net dollar cost savings to the housing authority, but increases the capital improvement benefits. If the project costs go down, it increases the net dollar cost savings to the housing authority and decreases the capital improvement benefit. With the frozen base, then, the net dollar cost savings to the housing authority will always depend on the project cost, but the total benefit to the housing authority will *only* depend on the total project savings that are generated. There is simply a trade-off between how many of this fixed amount of dollars are spent on capital improvements, and how much comes to the housing authority as cash. Therefore, in both Figure 6 and Figure 7, the total benefit to the housing authority is $2,625,000, the sum of the savings HUD allows the housing authority to capture.

The additional subsidy uses the same formula as the standard PFS method for determining dollar cost savings which accrue to the housing authority. Given a similar amount of consumption savings, each will produce the same net dollar cost savings to the housing authority, in this case, $375,000. The difference is in the capital improvement benefit. With the additional subsidy method, the housing authority receives an increase in subsidy sufficient to satisfy the annual debt service (with the caveat that savings must be at least equal to the debt service each year, or the following year's operating subsidy will be decreased by the amount of the shortfall). This extra pot of money extends the work a housing authority can afford for their properties. So in cases where a housing authority wants to do more work than its modernization funds allow, the additional subsidy has a clear advantage over the standard PFS method. The *total benefit is dependent on the cost of the project* (as opposed to the frozen base method, where the total benefit is defined by the savings generated by the project). For this example, if the project costs $2 million, the total benefit to the housing authority is $2,375,000. If the project costs $2.4 million, the total benefit to the housing authority is $2,775,000.

At first glance, it may appear that the frozen base will always result in higher total benefit to the housing

authority than the additional subsidy. With the frozen base incentive, HUD allows the housing authority to net 100% of the difference between the frozen rolling base and actual consumption. With the additional subsidy, the housing authority is only allowed to keep 50% of the dollar cost savings and the base isn't frozen. But as the example above demonstrates, whether the additional subsidy or the frozen base method is most advantageous depends on how close the cost of the project is to the total savings. Other factors which come into play are the size of the project and the amount of the savings. Remember, it is unwise to base

Figures 6 and 7 look at two scenarios where all the factors other than project cost are held constant. In the case where the cost is $2.4 million, which is relatively close to the total project savings of $2.5 million (Project costs are 96% of savings), using the additional subsidy results in a slightly higher total benefit to the housing authority (5.4% greater than the frozen base). Financing a project with costs this close to savings may happen if the housing authority's goal is to get as much investment into its buildings as possible. It does this by including as many items as possible, to the point where predicted savings are very close to the cost of the project. The total benefit is high because HUD pays the project cost dollar for dollar through the increased subsidy, and the housing authority still gets the savings from the first four years after the measures are installed as the rolling base catches up. This can be a risky strategy, though, if there is no third party guaranteeing savings. It is possible to miscalculate the savings potential of a project and have the shortfall between actual savings and the amount of the debt service deducted from the housing authority's operating subsidy. If debt service payments are that close to predicted savings, there is very little room for error in actual savings meeting predicted. The housing authority must be prepared to cover any shortfall, or use an energy services company to guarantee the savings.

When project costs are not as close to predicted savings, as in Figure 6, using the frozen base incentive results in higher total benefit to the housing authority. (In this case, 9.5% higher than the additional subsidy. This assumes the excess savings that are projected actually materialize. Generally, the guaranteed amount is set at the project cost. Actual retained savings over debt service may be higher or lower than projected.) In this example, the project cost is $2 million and total project savings are $2.5 million (Project costs are 80% of savings). This type of situation might result when the housing authority wants more breathing room for actual savings to meet estimated, or if its goal is to capture dollar cost savings as well capital improvements from a project.

Of course, timelines, scope of project, requirements of staff resources and all the other factors discussed in this chapter will also play into the housing authority's decision as to which route to use. Net savings is only one factor to be considered. And in a real world situation, the housing authority will not have sole decision-making authority as to which incentive to use for a conservation project. ESCos, lenders and HUD will have preferences based on the availability of modernization dollars, the type and expected life of the retrofits, the size of the project, the length of the loan if the HA is borrowing money and many other factors. Rates will not stay constant and other factors will introduce "noise" that may affect which incentive looks better when solely looking at dollar benefits to the housing authority.

The rate method can also lead to savings captured by the housing authority. Because it does not involve consumption savings or capital improvements, it was not included in Figures 6 and 7. This method appears

attractive because the housing authority may retain 50% of any savings negotiated, for an indefinite time. But the savings from this method are more volatile than others. With conservation measures, there is a permanent change in consumption, with a relatively secure savings stream. With the rate change method, everything depends on the market and the type of deal that the housing authority has structured for purchasing utilities. There will be times when it is the only feasible route – the facilities are already efficient, but utility bills are high because of high rates. In other cases, housing authority facilities may be inefficient and have high rates. When deciding which route to take in these cases, remember that lowering rates will result in lower savings potential for any future conservation work the housing authority may want to undertake. (Savings = rate $\times$ decrease in consumption.) This may make it impossible to finance a conservation package that was cost effective at the higher rate..

Summary

When determining which method for decreasing utility costs, if any, will work for a particular housing authority, the first step should be an analysis of fuel and water use and a review of past audits on the properties. This will illustrate whether there is a potential for conservation savings. If it is determined that a potential for decreasing costs does exist, the next step is to assemble a project team. This team must determine what specific goals the housing authority wants to accomplish through the project. The team should look at the risks, benefits and resource costs (both dollars and staff time) to help decide whether to pursue a rate reduction, a conservation project, both or neither. If it doesn't appear that a conservation project can be paid for from savings, and the housing authority still wants or needs to do the project, modernization funds may be the only route available. If the first cut analysis indicates that a cost-effective conservation project is feasible, the team must decide whether to use modernization funds, manage the project themselves with an additional subsidy or to pursue a performance contract. If using a performance contract, the choice of which incentive to fund it with will be influenced by the factors discussed above, and will probably not be finalized until during the energy services agreement negotiations. For each option, team members must weigh the benefit the housing authority may receive against the staff resources needed, the timeline constraints and the risks involved. After evaluating all of these factors, they should be able to choose the best route for their housing authority to follow.

UNIT 4. PERFORMANCE CONTRACTING

The chapters in this unit detail the process involved in successfully planning, implementing and completing a conservation project using performance contracting. Performance contracting may be used with either the frozen base incentive or the additional subsidy incentive. Chapter 10 discusses the preparation of a **Request for Proposals (RFP)** to use for selecting an energy services company. Chapter 11 details the process of selecting an ESCO. Chapter 12 covers contract negotiations of the energy audit agreement and the energy services agreement. Chapter 13 discusses project implementation. Chapter 14 outlines HUD's role in approving performance contracts.

CHAPTER 10

PREPARING THE REQUEST FOR PROPOSALS

Once the team has decided to pursue an energy performance contract the next step is to prepare a Request for Proposals (RFP). This document solicits an energy services company to provide the performance contracting services. The RFP provides information to the ESCOs about the project and the expectations of the housing authority, as well as requesting information about the ESCO and how they would address the project. Responses to this RFP will be used to choose the ESCO that will responsible for the project. Because the housing authority will enter into a long-term relationship with the chosen ESCO, and because the housing authority is liable for audit costs if no work beyond the audit is done with that ESCO under the performance contract, it is vitally important that a qualified, competent, financially sound ESCO is chosen. A well-prepared RFP can greatly increase the chances of selecting the best ESCO for a housing authority's particular needs.

This chapter discusses steps that should be taken prior to preparing the RFP and the components that should be included in a good RFP. A sample RFP is included in Appendix E.

1. Planning Checklist

In preparing an RFP, the following points should be considered and data should be gathered:

Investigate Contract Issues and Local Regulations

There are a number of contract-related issues to explore prior to preparing an RFP. The housing authority must determine whether it is authorized to enter into multi-year contracts, which are a necessity with performance contracts. State and local regulations should be reviewed for any restrictions regarding contracts and the bidding process that might need to be built into the RFP, or that would prohibit the use of a performance contract. In some regions, multi-year contracts and non-competitive bidding processes may present problems. If the housing authority has a union maintenance staff, the union contract should be reviewed to be certain that non-union ESCO personnel will be allowed on the premises to perform maintenance work and emergency service that might be called for in the performance contract. If non-union personnel are not allowed to work on the newly installed equipment, this must be spelled out in the RFP.

Determine Project Size

The housing authority needs to strike a balance between the need to keep the project to a manageable size and the economies of scale available to a large project. Because the performance contracting process can be complicated, and gathering data for an RFP can be time consuming, it is advisable that a housing authority considering its first performance contract deal with a relatively small number of buildings. ESCOs may not respond to the RFP if the project is too small. Annual utility bills of at least $200,000 to $500,000 are necessary to make the potential conservation savings attractive to an ESCO. Once the housing authority becomes familiar with the performance contracting process, larger projects can be undertaken. It may be advisable to write language into the RFP to allow the housing authority to increase the scope of the project at its discretion, without having to go out to bid again for an ESCO.

Perform a Short Energy Audit

A housing authority contemplating a performance contract should be familiar with the conservation opportunities that are available in its buildings. Most housing authorities already have performed audits to comply with 24 CFR 965.302. If some buildings have not been audited, a walk-through audit performed by the housing manager and maintenance staff should be adequate to give the team an idea of where savings opportunities lie. This walk-through will better enable team members to evaluate the proposals they receive in response to the RFP.

The housing authority should be cautioned, however, that it is unwise to spend significant sums of money on a pre-RFP energy audit. The ESCO selected for the performance contract will have a long-term financial stake in the conservation measures it installs. Therefore, it will conduct a thorough energy audit of the facilities to be retrofitted in order to gain a better picture of the conservation opportunities available. This audit will be far more in-depth than a standard compliance audit. Because the ESCO is guaranteeing the savings, it will want to perform its own audit, and not rely on one conducted by another party.

Investing large sums into an audit prior to choosing an ESCO is unwise since it will essentially lead to paying for the same service twice. The housing authority should only gather enough information to feel comfortable in evaluating the responding ESCOs' proposals.

Decide Which Buildings to Retrofit

Once the general size of the conservation project has been determined, specific buildings need to be chosen to include in the RFP. (Note that an evaluation of housing authority property improvement needs can also help influence the size of the project.) Several factors should be considered when deciding which buildings to include in the conservation package. Fuel and water use are discussed below in "Analyzing Baseline Utility Use." Other characteristics that should be sought include buildings that:

- need major energy-related updates in the near future. If a building needs a new boiler or other major capital improvement, replacing the old system as part of a performance contract package can free up housing authority funds for other purposes, making the conservation package even more attractive.

- already have cost-effective conservation retrofits recommended by energy audits performed under 24 CFR 965.302, HUD's requirement to perform an energy audit not less than once every five years.
- are in basically sound condition and not in need of major, non-energy renovation. It is very difficult to track savings in buildings that have gone through major structural changes.
- have a low vacancy rate, low turnover and no plans for substantial changes in use. Changes in building use make it very difficult to assign savings from the energy work that was done. The energy services agreement should outline what methods will be used to deal with any changes that do occur in how the building is used.

Consider Potential Measures

For the buildings that *are* chosen for retrofit work, every cost-effective measure should be considered. The combination of short- and longer-term payback measures can help maximize the conservation savings and capital improvements realized as a result of the contract. It will be much more difficult to cost-justify individual measures at a future date if the most savings-lucrative measures have previously been installed. It would be unfortunate to lose the opportunity for financing major improvements in housing authority properties by not including all the possible measures.

Gather Utility Data

The housing authority must provide utility data for the ESCOs to use when preparing their responses to the RFP. This will help them to determine which buildings show the greatest potential for savings and to make an estimate of the approximate conservation savings available. During contract negotiations, this data will be further refined into a baseline from which to calculate savings. This baseline will account for weather, energy-related improvements made during that time, changes in occupancy and failures of equipment or maintenance.

The utility information provided in the RFP should be more detailed than that in the initial fuel- and water-use audit. A minimum of three years' data on energy- and water-use must be collected for each of the buildings being considered as part of the conservation package. Utility use should be estimated as closely as possible for each building. Estimate, if possible, what percentage of the baseline fuel use is for domestic hot water, space heating and cooling, and the total consumed annually for lighting and appliances in each building. Being this specific in the RFP will help the ESCOs to prepare a list of possible measures that is more detailed and representative of what they might actually propose after the audit is performed. (See Appendix F for a sample format for presenting data.) Three years' data allows the ESCOs to feel confident that their energy calculations are not skewed by oddities in consumption from any one year. And three years is also the amount of data HUD requires for determining the level at which to freeze the rolling base.

Gathering baseline utility data can present a number of problems. The housing authority may not keep records of all the data needed to establish a baseline, e.g. consumption and rates, as well as billing amounts. If any of the necessary data is unavailable from the housing authority's records, the utilities that supply water, electricity, gas and/or oil should be consulted. Rates are public record and should be available through the state public utility or public service commission.

A May, 1995 survey by the HUD Inspector General's Office found that most housing authority buildings are *master metered* and have no check meters. (HUD Office of Inspector General, 1995) Master metering can make it impossible to determine from utility bills exactly how much energy was used in different parts of a building or in individual apartments. If more than one similar building is on a meter, an estimate of the utility use of each building can be made by dividing the total according to total floor space.

Other problems may include faulty meters, missed meter readings, readings that were not taken on a regular basis and estimated readings. Apartments that were vacant during the period being analyzed and significant changes in building use can also throw off the accuracy of the baseline, as can unusual energy use patterns from particular occupants.

2. Components of an RFP

After researching the issues in the planning checklist above, it is time to write the RFP.

It is important to keep the procurement procedure as straight forward as possible so that it will be easy for ESCOs to compete for the projects and for the team to evaluate their responses. But it is also important to be thorough in the request for information, in order to facilitate choosing the best ESCO for the project. A well-thought-out and complete RFP greatly increases the chances of a successful, trouble-free project.

A sample RFP can be found in Appendix E. It can be customized to fit the needs of the housing authority using it. When the team is drawing up an RFP tailored to a particular housing authority's situation, it should be sure to include all of the components that are in the sample RFP. These components are discussed below.

Overview

This section gives the ESCO an overview of the project: where it is located, who the contact persons are, what expectations the housing authority has for the conservation project and the contracts that will be used in implementing the work. It could reserve the right to expand the scope of work beyond the named properties. It should specify the type of measures to be considered and the types of services the ESCO is expected to perform. It should also state that the housing authority expects a guarantee of minimum energy savings, and that the payments under the contract will be contingent on projected savings being achieved.

The Procurement Process

This section outlines the process by which an ESCO will be chosen. The regulations pertaining to this process are located in 24 CFR 965.308(a). It specifies the use of the process for competitive proposals (24 CFR 85.36(d)(3)(i), with the cost of the audit being of less importance than the technical features of the proposal. The steps used to chose the ESCO should include site visits, submission of the written proposals, evaluation of the written proposals, oral interviews, modification of the written proposals into a "best and final offer" and development of the contract. The RFP should include a timetable of when each step will occur. These steps are discussed in detail in Chapter 9, "Choosing an ESCO."

Criteria for Awarding the Contract

Since the scope of work proposed by the different ESCOs will differ, a contractor can not be selected on the basis of a bid, as would be the case with a sealed bid . Instead, a comparative method that ranks the competitors according to their quality of work, their experience and their financial stability must be used. It is possible to ask for information on the ESCO's per unit costs and fees. See Appendix P for a sample problem that can be included in the RFP to help compare the various fee structures used by ESCOs. This fee scenario can help you evaluate the relative costs a complete project that you might expect from each of the responding energy services companies. It asks the ESCOs to provide information on their fees when the measures, measures costs, savings, and interest rates are defined. Because ESCOs structure their fees in many different manners, it is often difficult to compare the costs you may expect from one ESCO with another. This scenario helps you compare "apples to apples".

These costs, though, should be a secondary consideration to the other technical factors that are listed below. The ESCO should be chosen for their project management skills and their ability to achieve and guarantee the maximum savings from a project, among other factors. Such an ESCO may charge a bit more for their services than one that is not as financially stable or does not have as successful a track record of achieving savings. On the other hand, if an ESCO has unusually high prices, the project may not be able to cost-effectively address as many measures as the housing authority would desire.

The evaluation criteria that will be used to screen ESCOs should be described in the RFP. (See Appendix G.) These criteria fall into 4 broad categories: the ESCO's project management experience, and the technical, financial and legal approaches to the project that are proposed. The RFP should make clear that the information the ESCO provides to comply with the "Required Documentation" list (see below) will be scrutinized in light of the following:

1. Project Management

The ESCO should be evaluated on its abilities in the following areas:

- managing construction, repairs, regular maintenance and emergencies;
- finishing projects on schedule and in compliance with contract terms;
- coordinating the work of subcontractors, utilities, equipment suppliers, facility personnel and housing authority management;
- servicing and maintaining equipment over the term of the contract;
- providing training for management, maintenance staff and residents; and
- achieving resident participation in the project.

There should be a clear assignment of responsibilities to specific individuals and subcontractors for specific project tasks. The ESCO should also be evaluated on the quality of communications skills at the oral interviews and the company's responsiveness to the specific goals identified in the RFP.

2. Technical Approach

A number of areas should be examined, including:

- the ESCO's understanding of the existing building conditions, structures, systems, operations and schedules;
- the quality of a sample technical analysis for a similar facility, completed by the person responsible for this project's technical design;
- the qualifications of the company's technical design personnel, including the number of similar projects in which the personnel have participated;
- documented savings from past projects;
- the reliability of equipment performance during the life of past contracts;
- the comprehensiveness and clarity of the company's technical approach to the project;
- the baseline energy and water use calculation methodology; and
- the ESCO's ability to enhance project performance by adapting control strategies, equipment and maintenance practices in response to changes in utility rates, technology and building conditions.

While the choice of the ESCO will not be driven by the measures it proposes, nor the savings it estimates (without a complete audit, these are only preliminary estimates), the company should supply a preliminary list of proposed measures and estimated savings based on site visits and fuel data supplied. The housing authority may evaluate this list for comprehensiveness and reasonableness.

3. Financial Approach

The ESCO should be evaluated on the financial soundness and stability of the company and the completeness of its most recent fiscal report. Business and financial references should be included and checked. The housing authority should also examine the quality and clarity of a sample financing agreement and a sample project invoice. The housing authority should evaluate:

- the details of the ESCO's fee structure;
- the proposed methods for calculating annual payments and conservation savings;
- the proposed financing method;
- the ESCO's ability to obtain project financing;
- the reconciliation procedures for windfalls and/or shortfalls in project cash flow;
- the proposed cost for the energy audit; and

- the terms of the savings guarantee.

4. Legal Approach

Criteria for ranking an ESCO's legal approach include:

- the company's depth of understanding of HUD regulations relating to the HCD of 1987;
- the quality of a sample of a legal agreement similar to that which will be used in this project;
- the contractual terms used to deal with changes in building energy use, such as changes in occupancy and usage schedules; and
- quality of provisions for early termination of the contract.

The legal agreement should demonstrate flexibility to accommodate the needs of the housing authority.

Many ESCOs consider information on proposal specifics such as savings calculations, audit materials and fee structures to be proprietary. Under no circumstances should information from an ESCOs proposal be given to another ESCO.

Remember, the major emphasis in evaluating the responses should be on the qualifications of the firm, not the proposed price of the audit, nor the initial estimate of savings. The goal is to choose a firm the housing authority feels certain will be best able perform a technically accurate audit and that is well qualified to proceed with the work once the audit results are known.

Contract Specifics

The RFP should spell out the minimum and maximum length for the contract that the housing authority will consider (maximum allowed under the final rule is 12 years). It should outline the scope of services to be performed by the ESCO. These scenarios should include conducting an audit to be performed within a certain period of time (90 days is reasonable and usual) and submitting a package of measures – The ESCO's Approach to the Project – to be based on the audit results. (See Attachment A of the RFP in Appendix E.) If the housing authority accepts the final proposal, the scope of work will include the work outlined in Attachment A. The RFP should discuss provisions for renegotiating the contract and outline technical and other contract provisions that will be expected in a final contract.

Required Documentation

Provide a list of the documentation the ESCO should submit as part of its proposal. This should include general information, personnel information, financial references and project information. This list will be analyzed by the criteria above for selecting an ESCO.

Documentation Checklist

In order to ensure that all the required documentation is submitted, include a documentation checklist. This should include a sign-off from an ESCO representative, attesting that the information is complete, true and correct, and acknowledging that misleading or missing information may lead to the firm's disqualification.

ESCO Profile Form

To aid in the evaluation of the proposals, it is recommended that the RFP include a standardized form for the ESCOs to use when profiling their company. Ask the ESCO to supply a description of the structure of the company, its background, affiliates and parent company, if any, and a biography of key personnel.

Experience

Ask for a description of the firm's performance contracting experience, a project list and a summary of the performance of similar projects that the firm has completed. The ESCO should also include résumé's of personnel proposed for the housing authority's project, and a list of primary subcontractors. Request that the ESCO include a copy of an energy audit performed on a similar facility.

References

The ESCO should supply a list of similar projects it has completed, their addresses, and phone numbers for contact persons for each project. References should include at least two projects for which construction has been substantially completed and for which at least some savings data is available.

The Facility Profile

A facility profile must be prepared for each building in the planned conservation upgrade. It will become the technical section of the RFP. (See Appendix F.) The forms on pages F-4 through F-7 of the appendix can be used to record the data. The facility profile includes a description of the building, its heating system and the ways in which both are used, as well as baseline utility data. The following elements should be included:

1. Building Description

- Provide the building's name and address, a physical description and the year in which it was built.
- List the building contact person's name and phone number.
- Describe any recent modifications to the building that may have had an impact on energy use, and mention any planned changes to the building.

2. Building Operating Data

- Describe the current uses of the building and any planned changes.
- Describe parts of the building with special requirements for minimum or maximum temperatures, humidity or ventilation.

- Provide the average occupancy rate and billing days for the building.
- Outline the typical facility operating hours. If certain parts of the building are used on a different schedule or have a different energy use pattern than others because of differing uses or variations in occupancy, this should be noted.
- List the typical summer and winter thermostat settings used in the building. If setback thermostats are present, the setback target temperature and the hours during which the setback occurs should be noted.
- Describe the heating, ventilation and air-conditioning (HVAC) system specifying the type of equipment, its manufacturer, age and condition. Heating zones in the building should also be described.
- Provide a schedule of operation for the building's HVAC system for different days of the week and times of the year.
- Make note of holidays or other events that may have a significant impact on energy consumption.
- Briefly describe any conservation options that have been identified in previous energy audits of the building.

3. Building Physical Data

- For each building, list the number of square feet that are heated and/or cooled. If there are differences between the two figures, explain.
- Describe the construction of the buildings' walls, roof and windows, and summarize their state of repair.

4. Baseline Utility Consumption

- Describe the types of fuels that are used for heating, cooling and domestic hot water.
- Provide a schedule of fuel use and copies of applicable utility rate schedules for the last three years and a copy of typical utility bills for summer and winter. The use of energy and water can be recorded in the tables that are part of the sample RFP technical section.
- Report the average energy consumption per residence unit, if known.
- Provide copies of water and sewer bills and copies of sewer rate schedules for the last three years. If gas is bought on contract, a monthly price history should be provided, if available.

5. Energy Systems

- Describe the major energy-consuming systems in the building including HVAC, lighting and water

heating. Include: brand name, age and capacity of HVAC equipment, set-point temperatures for heating, cooling and domestic-hot-water systems and the type of ignition system used in each.

- List facilities and equipment in the building that use a significant amount of energy (2% of total energy use or more) such as kitchens, laundries, swimming pool or medical equipment. For kitchens, report how many meals are prepared each year.
- Describe the building's heating/cooling controls. If the building has an energy management system, list the manufacturer, the installation date and describe how it is typically used in different seasons.
- Estimate the total percentage of the lighted area in the building that is illuminated by **incandescent lights**, **compact fluorescent lights, standard fluorescent lights** and fluorescents with **high-efficiency ballasts**, and estimate the hours of operation for each.
- If high intensity discharge (HID) lights are used in significant numbers, describe the application for which they are used and the hours of use. HID lights are used in outdoors and in large indoor areas such as gymnasiums. HID lights have the highest efficiency and longest life (and highest cost) of any light.

6. Water Data

- Describe how water is metered in the buildings, and provide at least two-years' water meter readings.
- List the types of faucets, shower/tub assemblies and toilets being used in the building and the types of repair parts that have been used in the fixtures.

7. Improvement Opportunities

- Describe any serious problems that are being experienced in the buildings that may in some way be related to their heating and cooling.
- Mention any major energy- or water-related equipment that is due for replacement in the next five years.
- Mention any building improvements the housing authority would like to achieve as part of the retrofit.

Other Information to Include in the RFP

It should be stated in the RFP that the qualifications of the respondents will be given more weight than the audit price. Performance contracting follows the same procurement guidelines that govern small and minority-owned businesses, as defined in the Federal Register in 24 CFR 85.36(d)(3) & (d)(4).

The ESCO procurement process must be a full and open competition with public notice and advertisement. If performance contracting services are available only from a single source, a noncompetitive process may

be used for selecting the contractor. This occurs primarily when a utility or its exclusive contractor provides services or low-interest money for a project, that other bidders could not offer.

Offer to provide additional data on request. This might include copies of the actual utility bills for the last three years for the buildings; additional details on the buildings' mechanical systems including age, manufacturer, size, capacity, hours of operation and areas served; copies of previous energy audits and technical analysis of conservation measures for the building; and detailed documentation for the buildings' energy management system.

3. Next Steps

Submit the RFP for HUD Approval

When the RFP is finished, it should be sent to the HUD Field Office for approval. Field office staff may approve or reject the proposal, or may request changes to the document. If HUD has been notified in writing earlier that the housing authority was considering a performance contract, and has been involved in the process, this step should go smoothly. If the housing authority experiences unusual delays in receiving approvals, they may contact the office of Field Coordination in Washington, D.C.

Mail the RFP

Get an up-to-date bidders list from the National Association of Energy Service Companies, and when HUD approval is received, mail the proposal. Many ESCOs specialize in commercial and industrial customers. It is wise to research which are interested in multifamily residential work prior to sending out the RFP. The National Center for Appropriate Technology is one resource for obtaining such information. They have surveyed ESCOs as to whether they would bid on housing authority conservation projects and keep an updated listing. Any ESCO interested in serving the housing community will be added to the list upon their request. In addition to mailing the RFP to selected ESCOs, public notice of the planned conservation project must be printed in trade journals and local newspapers.

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CHAPTER 11

CHOOSING AN ESCO

Final ESCO selection is the most critical phase of the performance contract process. The performance contract may have a term of a decade or more, and it is essential not only that the contractor selected does quality work but that it be reliable and easy to work with.

The ESCO-selection procedure described in this chapter was developed by the state of Illinois for use by public agencies using performance contracting for conservation retrofits. See Appendix G for sample forms to use when ranking the ESCO's written response, Appendix O for suggested prompts and guidelines for the phone interview with the ESCO's references, and Appendix H for a sample point-scoring sheet for the for RFP evaluation.

The selection process satisfies the federal competitive-procurement requirements by using a formal process to select a contractor.

1. Site Visits

A pre-bid meeting for interested ESCOs should be scheduled for after the RFPs have been sent out. At this meeting, general information about the properties will be provided and questions about the RFP process will be answered. ESCO attendance at the meeting is optional, although it should be stressed when the meeting is announced that ESCOs not represented at the meeting will not have access to the same information as those in attendance.

The meeting should include a visit to the buildings included in the RFP. Make maintenance and operations personnel available to answer questions about the buildings and existing equipment, especially repair information. Any additional utility data requested by an ESCO should be provided at this time. Copies of past energy audits or facility analyses, schedules of equipment maintenance and repair, occupancy records and documentation for energy management systems are among the data ESCOs may require.

2. Evaluating Written Responses

Once the written responses are in, they must be evaluated by appropriate housing authority representatives. This group may be the same team that was used in preparing the RFP and should include the housing authority's purchasing agent, energy manager, administrative and financial officers and legal counsel. It should also include the designated project manager and the facility and operating engineers. Technical advisors and HUD Field Office staff may also be part of the team.

The criteria the team focuses on are the ESCO's qualifications and the cost of its energy audit. Since bottom-line pricing information for the project will not be available until the energy audit is complete, no precise comparison such as would be used in a competitive bid process can be used. The team must rank the ESCO as was laid out in the "Criteria for Awarding the Contract" section of the RFP, analyzing the

ESCO's technical, financial, legal and management approach to the project. (See Chapter 10 "Preparing the RFP." If a fee scenario such as that provided in Appendix P was included in the RFP, the team may have some pricing information that can be used for comparison. These should not drive the decision, but can help supplement it.

Comparisons can and should be made of what the different contractors are projecting as possible conservation measures and estimated savings in the site-specific discussion. Other factors are more important, though, in the choice of an ESCO to perform a major conservation retrofit: Is the company financially sound? Will the package of conservation measures the ESCO installs save enough utility money to make the payments on the loan? Will ESCO employees be easy to work with and eager to please both the housing authority and tenants? How good is the guarantee, and has the ESCO ever had to use the guarantee? Does the company have experience with housing stock similar to the buildings that are to be renovated? Such questions have at least as much bearing on which contractor is best for the job.

Ranking

A sample ranking system for ESCO proposals is provided in Appendix G. Each team member is given a copy of the proposal to rate. This enables the proposals to be evaluated by people with expertise in all the applicable areas, and makes for a much stronger review. Each question used to rank ESCOs is assigned a numerical weight. Although numbers are used in the ranking procedure, it must be emphasized that these are being assigned to comparative criteria — where experience and financial status have more importance than easily quantified factors, such as the proposed audit pricing. Selection committee members must be fair and impartial when evaluating the ESCO's responses.

Figure 8. Example from ESCO Proposal Ranking Form

MANAGEMENT

7. Quality of the project summary:

Superior __ Very Acceptable _X_ Acceptable __ Not Acceptable __ Unqualified to rank __

Discussion: The ESCO had a fairly complete, site-specific description of what they thought the project would entail. Their summary appeared reasonable, practical and thorough. They did not address the problems we have with the chiller in Parks Tower, however.

Reviewers are asked to rank various categories of the ESCOs' responses and to provide written comments supporting their ranking. The ranking classifications are superior (3 points), very acceptable (2 points), acceptable (1 point), not acceptable (0 points) and unqualified to rank, if the question pertains to an area outside of the reviewer's expertise. In the latter case, the question is deleted from the number of points possible. Each question is assigned a weight reflecting its overall importance as a judging criterion. The number obtained by the ranking (0-3) is multiplied by the weight factor assigned to each question to attain a numerical ranking. Figure 8 illustrates a question from the Sample ESCO Ranking Form. The ESCO was

rated “very acceptable” for this question. Figure 9 shows how this ranking is quantified on the Sample ESCO Ranking Form Score Sheet”. The ranking of “very acceptable” has a value of 2 points. The weighting factor for this question is 0.5. So the ESCO receives 1 point out of a possible 1.5.

Figure 9. Example from ESCO Proposal Ranking Score Sheet

	3 pts Superior	2 pts Very Acceptable	1 pts Acceptable	0 pts Not Acceptable	Unqualified to Rank	Weight	Possible	Actual	“Possible” Minus "Unqualified"
7.		x				0.5	1.5	1	1

Once all of the questions are marked and the points earned are tallied, a “ranking ratio” will be computed. This is done by dividing the number of points earned by the number of points possible. This ratio will be between 0 and 1. The closer to 1, the higher the ranking. For example, an ESCO that received 110 out of 129 possible points would have a ranking ratio of 0.85 (110/129). An ESCO that received 80 points out of 129 would have a ranking ratio of 0.62 (80/129). The first ESCO is rated higher than the second.

The ranking ratio is used, rather than a straight evaluation of points achieved, to account for the cases where a certain reviewer isn’t qualified to evaluate the ESCO in every category. Because of the diverse expertise of the team members, it is quite possible not all of the members are qualified to answer all of the questions. For example, a facilities engineer shouldn’t be ranking questions having to do with the companies’ financial statements, and the financial officer shouldn’t be evaluating measure packages for replacing aging boilers. If reviewers feel they have insufficient knowledge to rank the ESCO on some specific criteria, they should choose the “unqualified to rank” response. This is very different from the “not acceptable” response, which should be used when a response to the RFP is unclear or when important information is missing. If “unqualified to rank” is marked, the total number of points possible will be adjusted to exclude the points from that question. For example, if a reviewer marks “unqualified to rank” on a question with 6 possible points, the total number of points possible would be revised downward from 129 (the amount if all questions were included) to 123.

It is very important that the members of the evaluation team use the “unqualified to rank” rating when appropriate. They should not guess about the adequacy or inadequacy of the ESCO’s response or using the “not acceptable” ranking if they aren’t qualified to evaluate a response. Erroneous “not acceptable” ratings could eliminate the ESCO from further consideration, whereas the “unqualified to rank” category leaves the door open for the ESCO to remain in the competition, based on the evaluation of team members more qualified to evaluate that section of the proposal. For instance, if in the example above, the second ESCO may have only earned 80 points because the reviewer had marked “unqualified to rank” for a number of questions. If the total number of points possible from that question were only 86, the ranking ratio would be 0.94 (80/86), a much higher rating than the 0.62 (80/129) that results if all 129 points were used.

If the selection team believe that not enough proposals have been received to proceed with contractor selection, the housing authority must advertise the retrofit opportunity again, mail the RFP to an expanded list of ESCOs and start the evaluation process over. ESCOs that received but did not respond to the original RFP could also be contacted to see if they are interested in submitting a proposal before the new deadline.

3. Check References

The next step is to conduct phone interviews with the ESCO's references. The interviewer should talk to the persons who managed the projects listed in the response to the RFP, if possible. If the project manager is unavailable, try to interview another staff member who has extensive knowledge of the project. Sample interview prompts can be found in Appendix I.

4. The Short List

The results from the analyses of the written proposals are combined with the reference checks to establish a final ranking for deciding which companies to invite to oral interviews. Generally, the three ESCOs with the highest scores from the evaluation phase are selected, but more or less may be interviewed, depending on the results of the rankings. This initial screening should narrow the field to contractors that have a reasonable chance of being awarded the contract. This avoids wasting the housing authority and ESCO's time. The ESCOs on the short list should be mailed a letter stating the time and place of the interview and the interview format. ESCOs that were not selected for the short list should be notified that their proposal is no longer under consideration. This marks the end of the initial phase of contractor selection.

If the evaluation team should conclude that none of the proposals are acceptable, each of the finalists can be contacted and asked for additional information or a revised proposal. The housing authority may also choose to start solicitation for a new round of proposals.

5. Oral Interviews

The ESCOs on the short list are invited to oral interviews where they can further explain how they plan to undertake the conservation project and can respond to the selection committee's questions. All ESCO personnel with major responsibility for the project's technical design, management and negotiations should be present.

The interview allows the housing authority team to examine the ESCO's proposal in more detail. It is also an opportunity for the ESCO to introduce employees who would play a significant role in the retrofit, and to outline the ESCO's strengths to the housing authority team.

Two sets of interview questions should be prepared. One is a set of general questions that will be asked of all the ESCOs (see Appendix O). The other is prepared for the ESCO being interviewed based on its response to the RFP. The question topics are generally divided into two parts: approach to the project and site-specific recommendations. Questions should cover design; construction; financing; training; operation

and maintenance services; performance monitoring; and performance enhancement. If the interview questions require advance preparation on the part of the ESCOs, each ESCO should be provided with a question list at least ten days prior to the interview.

The interview typically lasts from two to four hours, with the first thirty minutes devoted to the ESCO's presentation. A facilitator should be appointed to ask the prepared questions. All the members of the interview team should be encouraged to participate in the discussion. As with the written responses, answers to questions may be rated and the ratings multiplied by the weight given each question to attain a numerical ranking. If this approach is followed, then at the end of each presentation, an initial ranking is made by each team member. After all the interviews are complete, the ranking for each ESCO should be done again to allow team members to change their initial rankings after considering all of the finalists' interviews. Some housing authorities use a less structured process for the orals, though and discuss merits afterward without going through a formal numerical ranking process.

6. Final ESCO Selection

The ESCO selection committee meets after all the interviews have been conducted to make a final selection. This can be a very formalized process, where a numerical ranking is assigned to all of the components, including the interviews of former ESCO clients, the evaluation of the ESCO's written response and the oral interview. These are then added up to produce a total for each of the finalists. If the total scores are quite close, the team may reconsider all the evidence and try to reach consensus based on the contractors' performance in the written proposal and interview phases. The process can also be less formal, where all of the numerical rankings from the written responses are considered in light of the other information, which may not have been quantified. The executive director of the housing authority can make the final decision, if this is requested by the evaluation team.

All the ESCOs that submitted proposals should be notified when a contractor is selected. Documentation from the selection process should be presented to the housing authority's board of commissioners along with an explanation of the rationale behind the final selection.

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CHAPTER 12

CONTRACT NEGOTIATIONS

1. The Energy Audit

After selecting the ESCO, the housing authority must negotiate a contract for the ESCO's energy audit. This is the energy audit agreement. (See Appendix N.) *This audit must be done, even though one or more audits have generally already been performed on all of the properties in the package*. The financial viability of the ESCO depends on accurately predicting the energy savings that will result from the conservation measures it installs. Therefore, the company must perform its own audit to be comfortable that the savings projections are accurate. The ESCO will generally perform a more exhaustive audit than previously has been undertaken.

An estimated price was part of the ESCO's RFP response, so contract negotiations are largely a matter of formalizing terms and conditions and the deliverables expected as part of the audit, although price may be negotiable, too. It is very important to spell out what the housing authority expects as a result of the audit. These deliverables generally include:

- A description of fuel-use analysis and its results;
- A description of the site that was audited;
- Problems identified during the audit;
- Proposed conservation measures and solutions to identified problems;
- Estimated savings from each measure and the package as a whole;
- Estimated costs broken down by measure; and
- A cost/benefit analysis, preferably using life-cycle costing.

The housing authority must pay the ESCO for the energy audit whether or not any further work is done. This cost may be rolled into the energy services agreement, with the payments based on savings being achieved, or a separate payment can be made to avoid accruing financing charges for the cost of the audit. If negotiations fail to produce a signed performance contract, the audit price must be paid up front.

Note that there are strategies available for mitigating the risk of paying an audit fee if the project does not move forward. Appendix N, "Sample Energy Analysis Report Agreement" has several examples of this, including a pro-rating of the audit fee if the housing authority decides to stop work prior to the completion of the audit. Another strategy deals with the risk of the audit not finding a cost-effective project. The ESCo should have evaluated the potential cost effectiveness of the project as part of responding to the RFP. The housing authority may include language in the RFP outlining the expectation of this due diligence responsibility on the part of companies responding to the RFP. The housing authority can negotiate

language in the audit to require the ESCo to stop work and not receive any compensation if at any point they determine a cost effective project will not be feasible.

The results of the energy audit are used by the ESCO to determine the savings potential of various energy conservation measures. This evaluation is used as a basis for determining what will be included in the performance contract. The energy audit becomes a part of the final contract.

After the housing authority and the ESCO negotiate the conditions for the energy audit agreement, it must be submitted to the HUD Field Office for approval.

2. Preliminary Energy Service Agreement Negotiations

Once HUD gives its approval of the energy audit agreement, the ESCO performs the energy audit on the buildings included in the RFP. While the audit is being conducted, representatives of the housing authority and the ESCO meet to begin negotiations for the performance contract. Housing authorities should be extremely cautious about using an energy services agreement provided by an ESCO. It is possible to shift the risk of the measures not performing away from the ESCO and onto the housing authority and tenants. This may not be obvious to a reader unfamiliar with HUD energy performance contracts. It is safer to use a template from a source without a financial interest in the contract, such as the one provided in Appendix J.

After the general conditions and format for the proposed performance contract have been agreed upon, the ESCO prepares a draft version of the contract. This draft then becomes the subject of final performance contract negotiations.

3. Reviewing the ESCO's Proposal

Once the energy audit is complete, the ESCO submits a proposal that includes the audit results, a list of proposed energy conservation measures, a financing package and a proposed contract, the energy services agreement. Before final contract negotiations can commence, the housing authority team must review the energy audit results, the ESCO's proposed list of conservation measures and the draft contract prepared by the ESCO.

Questions the negotiation team should answer when reviewing the ESCO's proposal include:

- Are energy rates and equipment costs accurate?
- Are calculations based on reasonable estimates?
- Are there any math errors?
- Does the audit include a comprehensive analysis of the technical options available?
- Have interactions between various measures been accounted for?

- Are all of the reasonable and desired measures included in the proposed package?

- Is the financial risk fairly apportioned?

The following areas should be covered in the contract, and evaluated by the housing authority team to ensure that its interests are met. Remember, the details of the contract are all subject to negotiation.

Project Description

The buildings to be retrofitted, the proposed energy conservation measures (ECMs) and the equipment to be installed should be accurately described in full detail. If the proposal doesn't contain all the conservation measures the housing authority wants, further negotiations may be necessary. The addition or subtraction of measures will alter the payback period and the proposed financing package will need to change to reflect these alterations. For this reason, an ESCO may be reluctant to renegotiate the measures included in the package, especially if the measures added are considered marginally cost-effective by the ESCO. Nonetheless, the housing authority should not be afraid to negotiate on the measures package, especially if it thinks viable options are not included. The performance contract is an opportunity to finance major improvements that would otherwise be lost.

Project Contacts

Both the ESCO and the housing authority should name an individual to act as their main point of contact. Generally it is best to have one person on each side in charge of tracking the project as a whole, although the contract may list people responsible for various portions of the project as well, for instance, billing or construction issues.

Methods and Terms of Financing

The housing authority's financial representatives should carefully scrutinize the financing arrangements that the ESCO proposes. (See "Financing Methods" in Chapter 5, "Introduction to Performance Contracting," for a discussion of financing considerations and options.) They should evaluate what measures are included in the package, whether the projected savings cover the cost of the contract, if the loan vehicle selected is the best option for the housing authority, if the interest rate is the best available and if the length of the contract meets HUD requirements and the housing authority's needs.

Contract terms of as long as twelve years are allowed, but HUD discourages repayment schedules longer than ten years. In the event of a shortfall in conservation savings due to "changed circumstances," such as equipment failures or maintenance problems, the contract would need to be extended to pay for the installed conservation equipment. Having the extra time would be essential to completely paying the debt service. Note that HUD specifically does not allow extension of the contract for miscalculations or misrepresentations of the projected savings (24 CFR 990.110 (e)).

The amount that can be financed and the work that can be done interact with each other, to an extent. As more work is done, the cost of the project goes up, but so do the savings, which allows for payments of a

larger loan. The optimal amount that can be borrowed is driven by a combination of the costs of the total contract, the savings, the interest rate, the term of the loan, the needs of the buildings and how much excess savings the housing authority desires. (See discussion of excess savings, below.)

Each of these factors plays off of the other. If the interest rate goes down, or the loan term goes up, the amount that can be spent on the project and/or the savings above that which is needed to pay the debt service increases. It should be remembered, though, that if the loan term is extended, the total cost of the project goes up, as interest is being paid for a longer period of time. If more measures are done, the savings go up, but so does the overall cost of the project. The goal is to get a measures package that meets as many of the housing authority's needs as possible, financed with the lowest possible interest rate and the shortest possible loan term.

Savings Calculations and Verification

The contract should specify the procedure by which the ESCO will calculate energy savings. This methodology should be mutually acceptable to HUD, the ESCO and the housing authority. A procedure for settling conflicts over the measurement of savings should also be included. There should be provisions for how changes in occupancy or building use, during the life of the contract, will affect the calculation of savings.

The contract should also outline how often the savings will be evaluated – i.e. monthly, yearly or longer – and how payments will be made if shortfalls occur. The frequency and details of this "true-up" can be negotiated. It should be done at least annually, so that the housing authority may be reimbursed if there is any shortfall in savings. Performance of measures should be monitored more frequently in order to find and address anything that may be increasing consumption.

The savings attributed to the work done under the energy performance contract is a function of two pieces of information: the baseline energy use and the post-retrofit consumption. Methods for calculating each are discussed below. For an even more detailed treatment of options available for savings verification, see the ***Building Measurement and Verification Protocol***. This manual is published by the Department of Energy and is gradually becoming the standard for measuring and verifying savings in complex buildings. Note, though, that HUD has requirements for measuring savings that may differ from the BMVP, so care must be taken to account for all of the HUD protocols when structuring savings calculations and measurement strategies.

Establishing Baseline Energy Use

It is necessary to establish how much energy and/or water is being used prior to installation of the retrofits under the performance contract. This is the baseline from which savings are calculated. Since savings will pay for the retrofits, it is vitally important to obtain an accurate baseline for each utility affected by the measures to be installed.

Establishing the baseline is a more detailed process than the initial fuel- and water-use analysis. A minimum of three years' data on energy- and water-use must be collected for each of the buildings that are part of the conservation package. Three years' data will give the ESCOs enough information to feel confident of their

usage calculations. It is also the amount of data HUD uses for determining the rolling base. The baseline is usually set at the level of the rolling base in effect at the time of the contract, barring unusual circumstances.

On occasion, the level of the rolling base at the time the performance contract is signed may not be representative of the use at that point. In these cases, the initial level of the rolling base needs to be adjusted. Energy or water use may have been unusually high or low for some reason during the three years being used for the rolling base, for example a major piece of equipment may have been off-line. Or the housing authority may have installed some conservation measures in the 4 years prior to the performance contract, which permanently altered the level of consumption.

Adjusting Baseline Energy Use

The contract should also outline how this baseline may be adjusted during the course of the contract. The energy services agreement will have provisions for adjusting this baseline depending on changes in occupancy patterns (e.g. is it a complex for the elderly or young families?), vacancy rates, equipment or usage. The contract should provide specific details of how any changes that occur in these factors after the measures are installed will be reflected in the savings calculations. In order to have an accurate base from which to adjust, it is important for the baseline data to be broken down as finely as possible, e.g. the data should specify what portions of current usage are due to each of these factors: uses, occupancy patterns and vacancy rate. If the baseline is adjusted, the frozen rolling base used to calculate operating subsidy must also be adjusted to reflect these changes.

In addition to the factors above, the energy used for heating the building should be adjusted for the actual weather that occurred during the baseline period, using the heating degree day change factor. This normalization process averages the annual heating degree days from the years that are used to compute the frozen rolling base. It then adjusts the amount of energy used in each year of the contract to the amount that would have been used if the weather had matched that of the rolling base period. The change factor is computed by dividing the actual degree days recorded over a contract year by the annual average of the degree days used in the utility baseline period. For example, if the average number of degree days in the rolling base period were 8600 but the first year following the retrofit experienced only 7950 heating degree days, the change factor for that year would be: 7950/8600 = .9244. The savings for that year would be multiplied by .92 to allow for the utility savings that were simply the result of the milder than average weather.

This removes any variability in fuel use due to changing weather conditions across years. This method for weather normalization is slightly different from the one used by PRISM as discussed in Chapter 8. In that case, both the pre-consumption and post-consumption usages are adjusted to “normal” weather, usually an average of 30 years historical degree day data. Both accomplish the same end. Note that HUD has not allowed normalization for weather when calculating the AUEL since FY 1996, nor does it allow for normalization of energy used for cooling.

Determining Post-retrofit Consumption

There are a number of strategies that can be used to determine post-retrofit consumption use. The simplest is to monitor actual consumption by feeding data from utility bills into a computer-based fuel-use analysis

program, such as the Princeton Scorekeeping Method (PRISM). (See Chapter 8.) This type of program will provide a "normalized annual consumption," taking into account differences in weather. But this strategy does not always perform well, due to several possible complications. The circumstances that might need additional provisions for ascertaining and assigning savings include the following:

- If HUD monies are used for energy-saving measures in combination with the performance contract, the savings due to measures funded by HUD must be factored out of the savings assigned to the performance contract.
- Changes in building use, occupancy patterns and/or vacancy rates. (See discussion above and "Material Changes" and "Unreported Material Changes" below.)
- Inaccurate or infrequent meter reads.

Strategies to combat these complications include:

- end-use monitoring, and
- engineering calculations to differentiate use for each type of utility.

Early and frequent evaluation of post-retrofit consumption is also an excellent method to identify measures that are not performing properly. So, although HUD only requires a true-up of savings once a year, it is wise to have the ESCO (and the housing authority) begin tracking consumption as soon as the measures are installed, and continue on a regular basis throughout the duration of the contract.

Material Changes

A material change to a building is defined as a physical modification or change in use that changes energy use more than a minimum amount that is specified in the contract. Remodeling of buildings or replacement of energy- or water-using equipment could both constitute a material change, as could an increase in the number of people using the building's laundry facilities. Changes in the use or hours of operation of building facilities, changes in occupancy and structural changes could all qualify as material changes. Changes to buildings as the result of condemnation, fire, flood and other events are also treated as material changes.

The contract should require that the housing authority report material changes to the ESCO in a timely manner, and discuss how material changes will affect other contract provisions. The contract must specify how adjustments to the baseline for material changes are to be made.

Unreported Material Changes

There may be cases where utility consumption increases after the measures are installed and no specific cause can be identified. This is known as an unreported material change. Most energy services agreements state that the baseline must be adjusted if there is an increase in consumption of more than a specified percentage and equipment malfunction or faulty repair can not be shown to be the cause. This section is designed to protect ESCOs from changes that may occur within the housing authority that are not easily quantified and assigned cause.

The housing authority must examine this section of the contract carefully and determine if there is a fair

apportioning of the risk from these sorts of unreported changes. Often, contracts put the burden of unexplained consumption increases on the housing authority. If usage goes up without explanation, the baseline is adjusted so that the increase is not counted when computing savings. In this scenario, there is little incentive for the ESCO to search out elusive technical reasons why consumption may have increased. The housing authority should negotiate to ensure that the risk of these types of unreported changes is apportioned fairly. This can be done by inserting mechanisms to assign a percentage of the increase to both the housing authority and the ESCO. This gives the ESCO an incentive to search out elusive technical reasons for the increase. Another tactic is to insert language that allows for third party arbitration of any disputes that may arise as to unexplained causes of increased consumption.

The Energy Savings Guarantee

The energy savings guarantee is the heart of the performance contract. To satisfy HUD requirements for performance contracting, the ESCO *must* guarantee that a minimum level of conservation savings will be generated as the result of the installation and operation of equipment, the improvement of the building shell and the provision of services by the ESCO. The guarantee is usually expressed as a dollar amount in the contract, but its basis is kilowatts of electricity, therms of natural gas, gallons of fuel oil or other units of consumption that are saved. The prevailing utility rate at the time the contract is signed becomes the baseline and the floor below which utility rates will not fall when computing savings, if a floor rate is used. The savings guarantee, which generally is between 65 and 90% of predicted savings, should be enough to cover loan payments in the worst case scenario, i.e. when the floor utility rate is being used to calculate savings.

Backing the Savings Guarantee

The contract should also describe how the guarantee is backed. This can be done a number of ways, including having the ESCO provide letters or lines of credit, setting up an escrow account, obtaining an insurance policy or bonding. If an escrow account, letter of credit or line of credit is used, it is wise to have at least one year's savings available as backing. These are perhaps the most secure of the various options. There is an annual charge for these guarantees. Some ESCOs will suggest that the housing authority may save money by canceling the guarantee after a track record of satisfactory measure performance. This is a risky strategy, since savings may decrease over time as measures age. It may also conflict with 24 CFR 990.107(f)(1), which specifies that payment must be dependent on savings.

A number of companies offer insurance policies that protect the ESCO in case actual savings don't meet the amount guaranteed. If the ESCO proposes to use an insurance policy to back the guarantee, be sure to examine it carefully for clauses that conflict with arrangements in the energy services agreement and for loopholes that might allow the company to refuse to pay a claim. Examine how much is covered and if there are any limits to liability. Make sure there are no legal restrictions in your state on this type of policy. A draw back to using insurance is the introduction of a third party into the negotiations of the energy services agreement and in case of any shortfall of savings. Insurance policies usually cost a percentage of the total project cost. The cost of the policy will vary depending on the coverage provided and the risk the company feels is involved, but may range from 5% to 7% of total project cost. This amount is paid up front and covers the full term of the contract.

Surety bonds may also be used to back savings guarantees. These bonds are usually less expensive than other options and can be renewed annually. Their disadvantage is that their cost may rise dramatically each year if savings do not meet predictions.

The housing authority should be comfortable that the financial backing will be available if there ever is a shortfall in savings. If the housing authority is uncomfortable with the method that is proposed by the ESCO, it can negotiate for another one.

Structuring the Savings Guarantee

Some energy services companies guarantee the amount of savings for the entire project, not an annual amount. This is known as **accumulated savings**. In these cases, the amount of the guarantee is usually set exactly at the amount of the debt service. There is still an annual true-up between actual and predicted savings. If the actual savings exceed the predicted savings, that excess is credited to the amount of total savings that are guaranteed. If savings don't meet predictions in future years, the ESCO is not liable to pay for the shortfall until after it is greater than the past amount of excess savings.

An accumulated savings guarantee has significant disadvantages to the housing authority. Any excess savings it may accrue during a year is not safely its own until the end of the contract, which may be a decade away. The housing authority is at risk until that time for having to come up with enough money to cover any future shortfall in savings in order to cover debt service payments. This is especially detrimental if a housing authority chose the performance contracting route specifically to have excess savings to supplement its operating subsidy.

Another common practice that may not be beneficial to the housing authority is the use of **escalation rates**. In a contract with escalation rates, the utility rate that is used to convert consumption to dollar costs is automatically increased every year. This has the affect of increasing the dollar savings for a given amount of consumption. (See discussion of rate increases in Chapter 7.) It will result in more projected savings. Projected savings, along with cost of retrofits, are what define the limits of cost effectiveness for a project. So escalation rates can result in more investment. If rates don't increase as stipulated, the amount of consumption savings can fall off with the ESCO still meeting its guarantee. Because of the difference between the rate used in the savings calculation and the rate the housing authority is actually paying, the housing authority may get into a situation where it hasn't realized enough dollar cost savings to cover the debt service, but the ESCO's guarantee is not activated. Whether this occurs will depend in part on whether HUD allows the housing authority to use the escalation rate on the 52722-B form. It is best to stipulate that actual rates with a floor rate will be used when calculating savings.

Excess Savings

Excess savings occur when actual savings exceed the amount needed to cover the debt service and other fees associated with the conservation project. Guaranteed savings are usually set so that these costs will be covered in the worst case scenario – where the rate used to calculate dollar cost savings is equal to a floor rate. This means when dollar cost savings are calculated with the floor rate, and consumption decreased only by the guaranteed amount, there would be no excess savings. It is important to note that excess savings

is not the difference between predicted savings, which may be higher than the amount guaranteed, and actual savings. It is possible for actual consumption to be less than predicted, but still be over the guaranteed amount.

HUD allows a housing authority to keep 100% of the savings attributable to the installation of measures financed by non-HUD funding. At least 50% of those savings must go toward paying off the debt service. This means that a possible total of 50% of the savings could be used by the housing authority to fund other HUD-approved activities. Although in actuality most performance contracts need more than 50% of the savings to finance the debt service and cover other project fees (up to 90% or more), deals are usually structured so there are some savings available to the housing authority over and above that amount. This is especially true if the rate used for calculating dollar cost savings is above the floor rate.

How these excess savings are handled can be a subject of negotiation in the contract talks. Of course, the housing authority could elect to keep all of the savings. An alternative strategy is to split the savings with the ESCO by some pre-arranged percentage. For instance, the deal might be structured so that the housing authority gets 100% of the savings, up to the amount needed to make the loan payment. Anything above this amount might be split 50/50 This provides the ESCO with excellent incentive to get the maximum performance out of the project.

Make sure, though, that it is very clear what the ESCO means when they discuss splitting savings. Having incentives or fees based on a percentage of excess savings is much different than having them based on a percentage of the total dollar cost savings to the housing authority. It is sometimes difficult to determine from the boiler plate of proposals which of these fee and incentive structures the ESCO is proposing. The following 4 scenarios illustrate the implications of this distinction.

The ESCO predicts the project will save $100,000 annually at the floor rate. It guarantees 75% of this amount, which is enough to cover the $75,000 annual cost of debt service. This stays constant in each of the examples below. They propose incentive-based fees of 12%. Whether this is 12% of the excess savings, or 12% of total dollar cost savings will have a great impact on the total cost of those fees. It can impact whether the housing authority is able to meet the annual costs of the project.

The first example will examine the case when the percentage fee is based on the total dollar cost savings to the housing authority and the project achieves the predicted amount of consumption savings. The accounting will look like this when cost of the utility is at the floor rate:

Estimated savings = $100,000

Actual Savings = $100,000

Incentive-based Fee = $12,000 (12% of total savings)

Debt Service = $75,000

The housing authority nets $13,000 ($100,000 Actual Savings - $75,000 Debt Service - $12,000 fee).The guarantee does not come into play, because the estimated savings are above the guaranteed amount.

The next example looks at a case where actual consumption savings generate $80,000 when computed at the floor rate. The estimated savings are not achieved, although they are still above the guaranteed amount. In this case, the housing authority may not net enough to cover the debt service, depending on how the fees are structured. Now the accounting looks like this:

Estimated savings = $100,000

Actual Savings = $80,000

Incentive-based Fee = $9,600 (12% of total savings)

Debt Service = $75,000

Before the fee is paid, the housing authority nets $5,000 ($80,000 Actual Savings - $75,000 Debt Service). But after the $9,600 fee is paid, the housing authority is in the red $4,600. The guarantee does not come into play, because the estimated savings are above the guaranteed amount.

When fees are based on a percentage of excess savings, the scenario is quite different. The following examples will use the same numbers as above, only altering where the incentive-based fee percentage is applied.

In the case when actual consumption savings equal estimated consumption savings, the accounting is as follows:

Estimated savings = $100,000

Actual Savings = $100,000

Debt Service = $75,000

Excess Savings = $25,000

Incentive-based Fee = $3,000 (12% of excess savings)

In this case, the incentive based fee is much smaller, and the housing authority nets $22,000 ($100,000 Actual Savings - $75,000 Debt Service - $3,000 fee).

If the actual consumption savings are less than predicted and only generate $80,000 when computed at the floor rate, the accounting is as follows:

Estimated savings = $100,000

Actual Savings = $80,000

Debt Service = $75,000

Excess Savings = $5,000

Incentive-based Fee = $600 (12% of excess savings)

The housing authority nets $4,400 ($80,000 actual savings - $75,000 debt service - $600 fee).

If incentive-based fees are applied to total dollar savings, the housing authority is at risk of having to pay out more in fees than it takes in from savings. So it is best to only have percentage-based incentives on excess savings. If an ESCO proposes to have any of their fees based on a percentage of the total savings, the housing authority should make structure the agreement to protect itself from project expenses exceeding savings. This can be done by specifying a cap on incentive-based fees so they do not exceed excess savings.

ESCO Fees

The following types of ESCO fees are typically specified in an energy services agreement:

- **Hard costs:** These are costs for the purchase and installation of equipment and measures that will be installed under the contract. Examples would be boilers or insulation.
- **Soft costs:** These include project design, materials specification, bid solicitation and project management. They are also paid out of the construction account. Often these costs are structured as a percentage of an applicable section of project costs, e.g. engineering may be 7% of the costs for purchasing and installing any equipment that is part of the project.
- **Savings guarantee fee:** These fees are discussed in the section above.
- **Construction financing fee:** If a separate construction loan is taken out to establish the construction account, there will be fees associated with it, above the charges for the project financing. The project usually can be financed under one loan, in which case the project financing charges would cover the construction account.
- **Monitoring fee:** This generally includes utility-account management, consumption monitoring and reporting, and annual equipment and systems inspection.
- **Staff and resident training fees:** There will be charges for training at the beginning of the project, and annually thereafter.
- **Energy audit fee:** This fee may have been paid to the ESCO out of modernization or other funds prior to closing on the permanent project financing. If this is the case, they can now be paid out of project financing, allowing the housing authority to reimburse the pot which originally paid for the audit.

The time when payment comes due on the costs above varies. The discussions below outline where each type will generally occur.

Up-front fees are incurred and must be paid prior to signing the energy services agreement. The energy audit may fall into this category, as would any fees to consultants who are helping the housing authority

navigate the performance contracting process. Consultants may perform services such as fuel use analysis. Any up-front fees may be rolled into the performance contract and reimbursed after the energy services agreement is signed and financing is in effect.

Implementation costs. A construction account is generally established after closing on financing. The housing authority has control over this account. The ESCO invoices the housing authority, usually monthly, for materials, sub-contractor labor and other construction fees. They bill based on the percentage of work that has been completed and inspected. Both hard and soft costs are paid for out of the construction loan and are, therefore, implementation costs.

Annual fees may be assessed for tasks such as monitoring savings, utility-account management, inspection of equipment, and resident and staff education. These fees are typically paid for out of the cash flow resulting from conservation savings. If the ESCO is responsible for routine equipment maintenance, this is also dealt with through an annual fee. When evaluating the cost effectiveness of a proposed performance contract *make sure that these annual fees are considered and that savings are sufficient to cover them*. Also check that these costs are not included in the financing package. It does not make sense to finance costs that aren't incurred at the beginning of the project and can be paid for out of the annual savings stream of the project. Annual fees can be structured as fixed charges, paid for with a percentage of each year's savings or billed at an hourly rate.

It is useful to examine proposed annual fees as a percentage of annual savings. This provides a reality check on how much various fees are draining away from the housing authority. This can help the housing authority to determine if they want to negotiate on the price of the fee. They may also consider altering the scope of work (e.g. structuring a maintenance contract in a different manner) in order to retain more of the savings, if this will not negatively impact the project.

Billing Procedure

There are a number of transactions that should be outlined in the energy services agreement. The billing procedure to be followed by the ESCO during construction should be specified in the contract, and a sample invoice provided. Once construction is complete and the project financing becomes due, the ESCO or the lender will regularly bill the housing authority for payments on the interest and principal. Due dates and penalties for late payment should be outlined in the energy services agreement. If there are shortfalls in savings, the ESCO will reimburse the housing authority. In order to track consumption, the ESCO will need copies of utility bills. The contract should specify how often the housing authority is to get this data to the ESCO and in what format, as well as the timeline for reimbursing the housing authority in case of shortfall. Payment schedules and structure for any annual fees, such as the ESCO's compensation for maintenance and emergency service of equipment, must be detailed in the contract.

Annual Reconciliation

The contract should specify when the annual true-up will occur, what the housing authority's obligations are for supplying data, and how long the ESCO has to produce the report and pay any shortfall in savings that may occur. It should also specify the timeline for any incentive payments the housing authority may owe the

ESCO for excess savings.

Conservation Hardware, Equipment Warranties and Ownership

The brand and type of equipment is a negotiable part of the contract. If a housing authority has dealt with one manufacturer in the past, it may be wise to continue to specify that brand of equipment, if the equipment has performed reliably in the past. The housing authority maintenance staff is familiar with that brand, there will be fewer types of equipment for them to learn and fewer parts to stock, and there is less likelihood of compatibility problems between various components of a system.

The contract should state that ownership of installed equipment reverts to the housing authority at the end of the contract period. Title to the equipment may be with the housing authority, the ESCO or the lender, depending on the financing vehicle and the structure of the ESCO's energy services agreement. The ESCO should guarantee that all equipment installed is new, in good working condition and fully covered by equipment warranties for both parts and performance. Further, the contract should require that all parts and equipment installed during maintenance and repairs will be new and that they will be covered by warranties that are transferable to the client, either at the time of installation, or if the equipment is leased, at the time title is transferred to the housing authority. If there are any equipment problems that are covered under warranty, the ESCO should agree to work with the manufacturer or seller to have the equipment replaced or repaired and to pursue them legally if the conditions of the warranty are not satisfied.

Equipment Maintenance

The responsibility for regular maintenance, the repair of malfunctions and emergency repairs of equipment must be clearly delineated in the energy services contract, especially in cases where new parts have been installed in existing equipment. Terms of access for equipment monitoring and maintenance and for emergency repairs must also be spelled out. If the housing authority's staff are responsible for maintenance, the energy services agreement should spell out the training needed in order for housing authority staff to become qualified to care for the new equipment.

Specifying subcontractors

The ESCO is acting as general contractor and has responsibility for selecting the subcontractors. Because the company is guaranteeing the savings, it must have control over who will be working on the project. But ESCOs often use local subcontractors, and the housing authority can negotiate for the ESCO to consider or avoid certain contractors.

Staff and Resident Training

The training of maintenance staff and providing of resource-efficient education for building residents are integral parts of ensuring that the predicted conservation savings are realized. A good training program should be part of the finalized performance contract. This training may be carried out by ESCO staff or a subcontractor. The contract should delineate the type and amount of training to be provided to residents and staff and itemized costs for each. The ESCO should provide training as part of the initial project and also in the years after completion in order to reach new staff and residents. The method of payment for the

training, which is eligible to be reimbursed through conservation savings, must be described in the contract. Generally, there is a set fee negotiated. Another alternative is to specify a percentage of the excess savings will be used to pay for the training.

Comfort Standards for Residents

Performance contracts with housing authorities are different from commercial and industrial jobs. With housing authorities, the work will be performed on people's homes, while they are occupying them. Therefore the contract should guarantee that comfort standards for residents will be preserved throughout the project. Minimum day and nighttime temperatures should be specified during the heating season, and maximums for the cooling season. Limited disruptions to water and domestic hot water service should also be negotiated. The housing authority's rules for required notice before entering apartments should also be included in the contract. The housing authority should check to see if there are any local regulations that set limits for any of the above factors. If so, those levels should be outlined in the contract.

Default and Arbitration

The procedure to be followed in the event of a default by either the ESCO or the housing authority must be laid out. A method for resolving disputes relating to the energy services agreement must be a part of the contract. The payment of the expenses related to the resolution of such disputes must also be addressed. Dispute resolution is usually accomplished by bringing in a mutually agreed upon third party. The costs of this dispute resolution may be a "winner takes all" approach, where the party that is ruled against pays, or there could be a predetermined percentage split.

General Construction Standards

The project must meet the general conditions for construction spelled out in HUD 5370. The ESCO must certify that the project will comply with all state and local building codes, certifications and licensing standards. A registered professional engineer must review and approve the retrofit plans.

Local Prevailing Wage and Insurance

The ESCO must guarantee that local prevailing wage will be paid to workers on the project, and must agree to provide evidence on request that the salary guidelines spelled out in the contract are being met. The ESCO must carry Workman's Compensation Insurance for employees who work on the project. The ESCO also must carry a casualty and liability insurance on the equipment to be installed and a liability policy for its employees. The ESCO is generally required to produce a completed insurance or performance bond prior to commencement of the work. Certificates of insurance must be provided for the construction and operation phases of the project.

No Additional Personnel

The contract must guarantee that the housing authority will not have to hire additional personnel for the project unless a specific exemption has been negotiated.

In-Progress Approval of Work

The ESCO is responsible for all equipment installation under the terms of the performance contract. Housing authority staff should, however, be familiar with the conservation equipment involved, and should monitor its installation. The staff will also have to coordinate the ESCO's work with residents and will have to resolve any conflicts between the ESCO's work and activities that normally go on at the facility. The facility engineer or operations supervisor is normally responsible for providing such coordination.

ESCO staff must be granted full access to the facility for testing and approval of work during the construction phase. All books and construction records relating to the project should be available for the housing authority's inspection at any time.

All of these factors should be discussed by the housing authority and ESCO, and spelled out clearly in the energy services agreement.

Commissioning

New equipment doesn't always operate according to specification. **Commissioning** is the process of testing equipment to see if it is performing as rated. Boilers and furnaces, blowers and pumps, heat pumps and other equipment that produce or move energy should be tested to confirm that it is working properly. Manufacturers' performance specifications for equipment are part of the energy services agreement, and procedures for confirming equipment performance must be specified in the contract. If possible, these criteria should be quantifiable and performance based.

Substantial Completion and Commencement Date

Payments and savings calculations will begin on the **commencement date**. The contract should define how this date will be set. It is often the first day of the month following the housing authority signing a certificate of **substantial completion**. The contract should also specify how consumption savings that occur during the construction period, before the commencement date, will be handled. Usually these savings are counted toward the guaranteed savings of the first year.

Drawings, Reports and Materials

The ESCO must supply the housing authority with copies of installation drawings, operating and maintenance instructions, reports, equipment manuals, warranties and other pertinent information.

4. After Negotiations

If, after negotiating the above issues, the housing authority and the ESCO agree on the elements of an energy services agreement, the document must be submitted to the local HUD field office for its approval. Once HUD has signed off on the completed contract, the principals may sign the contract and it will be in force.

If the housing authority and the ESCO can not reach agreement on the terms for the performance contract, the housing authority would have to initiate a new RFP process and pay for the ESCO's energy audit.

Since this would cost the housing authority time and money, it is best that an agreement be reached, if at all possible.

CHAPTER 13

PROJECT IMPLEMENTATION

1. Beginning the Project

After the energy services agreement is signed, the ESCO begins its work. The ESCO will arrange financing for the project, which may include a separate construction loan or just a construction escrow account from the main financing. It will sign on subcontractors for the project. Its project manager will contact housing authority staff in order to coordinate the construction around any activities that the housing authority run in its facilities. The ESCO and the housing authority representative will also need to work together to develop a communications plan to provide notice to the tenants of when work will begin, how it will affect them and if and when access will be needed to their apartments. Once all of the necessary pieces are in place, the installation of the equipment will begin. Careful consideration during contract negotiations of how to coordinate construction schedules with housing authority needs should help this process go smoothly.

2. Final Quality Control and Equipment Check

Before the project is officially complete, the housing authority's approval of the installation of conservation measures and equipment performance is required. Housing authority staff should inspect the job when it is completed, looking for unfinished details and assessing the quality of the work. Any deficiencies should be noted and corrected before the housing authority signs off on the job by certifying substantial completion.

Commissioning

Equipment commissioning should be carried out at this time according to the conditions specified in the energy services agreement. If the testing is carried out by ESCO personnel, a housing authority representative should witness the procedure. Malfunctioning equipment must be adjusted or replaced before the job is declared complete.

3. Payments Begin

The commencement date for payments to the financier and calculation of the savings should have been specified in the contract. Compensation to the ESCO for service and maintenance called for in the performance contract generally doesn't start until one year after the commencement date.

4. Monitoring Conservation Savings

The energy savings attained as a result of the conservation measures adopted are at the heart of the performance-contract process, so accurate monitoring of utility consumption data is essential. This data will be compared against the baseline consumption to determine energy savings. Accurate monitoring also provides housing authority staff and ESCO employees with feedback on the energy performance of the buildings. It allows them to spot malfunctioning equipment and to make adjustments that will improve energy

efficiency.

Utility bills, weather data, building maintenance and operation logs, and reports from the maintenance staff on building equipment operation and changes are the principal sources of monitoring data. The housing authority is required in the energy services contract to forward copies of utility bills to the ESCO in a timely manner, and the ESCO will compute conservation savings each month under the formula agreed to in the contract. The housing authority is also required to report any material change in building use. (See Chapter 12.)

Reports

From the monitoring data, the ESCO will prepare regular reports for the housing authority, usually monthly, which summarize conservation savings. It should compare estimated to actual savings, after adjustment for the heating degree day change factor. To be useful, monitoring data must be accurate, timely and easy to understand. The findings should be summarized in an easy-to-read graphic format that clearly compares actual savings with predicted savings.

5. Conservation Training

Training of housing authority staff and residents may take place before, during and after construction. It is important to have some outreach and information sessions prior to commencement of construction, to inform staff and residents of what will be happening, how they will be affected and what may be expected from them. Such training increases the performance and useful life of conservation measures by increasing the staff's understanding of the operation of the new equipment, and may be required if housing authority maintenance staff are responsible for maintenance of the new equipment. Resident training can help increase savings and decrease complaints by informing the tenants of the changes to expect in their homes.

One goal of the training is to demonstrate that conservation serves the interests of staff and residents by increasing comfort, reducing utility bills and increasing housing authority funds for other improvements. The quantity and duration of conservation savings can be maximized by educating the management, staff and residents of the buildings being retrofitted.

Involvement

A good energy training program will actively involve all the participants in a dialogue versed in terms of the building they live or work in. The training session should cover the basics while remaining flexible enough to respond to the needs of those receiving the training. The instructor should provide each student with opportunities for hands-on learning with lots of feedback on their personal concerns and questions.

Utilities and government agencies provide a wide range of brochures and instructional materials on all aspects of energy conservation. These are usually supplemented by handouts prepared by the trainer. The instructor should thoroughly explain the handouts, not just distribute them with the expectation that they will be read and understood.

Housing Authority Staff Training

After the ESCO has completed the installation of equipment and has made any other modifications called for in the performance contract, maintenance staff should be instructed on what their responsibilities will be and what changes in the operation of the buildings may be expected. They should be familiarized with the new equipment, and its operation and maintenance. Maintenance logs and manuals should be provided. Periodic reviews on maintenance procedures should be offered. It is especially important that good procedures be laid out for the training of new or substitute maintenance staff.

If the ESCO has signed an energy services agreement that calls for it to take full responsibility for operations and maintenance of the new equipment, as is frequently the case, in-depth training on the equipment is sometimes postponed until close to the end of the contract period. Because it is essential for the staff to have a basic understanding of the retrofit measures and their effect on the buildings and residents, some training should be provided earlier.

Non-maintenance staff should also receive training. They will be interacting with tenants and should be made aware of what the conservation project will entail. Their working environments may also change, so training should outline what they can expect and how they can contribute to making the project a success.

Resident Training

The apartments are the residents' homes and they are understandably curious and wary of changes that are being made. They may be asked to let workers into their homes and put up with inconveniences during construction. A quality resident education program can help increase and maintain savings over the life of the project, as well as decrease the number of resident complaints during and after construction.

The 1987 HCDA provided that costs for educating residents about energy and water conservation can be recovered from conservation savings. The training is paid for over the life of the contract. Housing authority staff must work with the trainers to plan and carry out resident education. The staff must act as a liaison between the ESCO and residents, scheduling meetings and training sessions and announcing demonstrations of the new equipment to residents. In some instances, conservation trainers may be invited to individual apartments to show residents ways to save energy and how to operate conservation equipment, such as a setback thermostat, that is installed in their apartment.

6. Capturing the Savings

It is vitally important that the staff responsible for completing the paperwork for year-end adjustments to the AUEL to be instructed on how this form should be filled out during the contract period. When completing the 52722-B form, they must be aware that they should use the consumption amount of the frozen rolling base, and not actual consumption, for the properties involved in the performance contract. Adjustments made to the baseline used for calculating savings for purposes of the savings guarantee should also be made to the level of the frozen rolling base. Staff must also be aware of the process for unfreezing the rolling base so that savings may continue to accrue to the housing authority for the first two years after the contract ends. (See Chapter 5, "Introduction to Performance Contracting.") In addition, the standard method of using the

form results in the housing authority receiving only 50% of the savings, not 100%.

There is no approved method for doing this reconciliation. A housing authority should work with their ESCo and HUD to develop a methodology that is acceptable to all parties, bearing in mind the issues outlined above.

7. Concluding the Contract

At the end of the project, the rolling base will unfreeze, and the operating subsidy will begin to return to a level which matches actual consumption. After 3 years, all further savings from the conservation measures will go to HUD. (See Chapter 5, "Introduction to Performance Contracting.") Warranties and ownership of equipment will pass back to the housing authority, if they were in the name of the ESCO or the financing company during the contract. The housing authority should consider continuing periodic training of residents and staff on conservation measures and preventive maintenance. This will help ensure that consumption does not increase after the contract period ends.

CHAPTER 14

HUD'S ROLE

HUD plays an integral role in issuing approvals and providing oversight for all of the incentives discussed in this guide. A housing authority that wishes to use any of these incentives must check work with its local HUD field office. The approvals needed are outlined below.

1. Performance Contracting

Performance contracting has always been used with the frozen base method and may also be used with the additional subsidy incentive. Performance contracting gives the housing authority considerable leeway in arranging a conservation retrofit, but the final contract must conform to HUD rules and federal contracting regulations. HUD approval of key documents is required.

It is best to involve HUD early and often through the process of securing a performance contract, to avoid mistakes and unnecessary paperwork. A housing authority representative should notify the HUD Field Office if performance contracting is being considered for a conservation project. A preliminary meeting with HUD Field Office personnel to open lines of communication and to review documentation requirements can also help the project go more smoothly.

HUD Approvals

Elements of the performance contract process that require HUD approval must be reviewed by the housing authority's HUD Field Office. The request for proposals, the energy audit agreement, the fuel baseline that is established by the ESCO after the energy audit, and the energy services agreement all require HUD approval. It can be helpful to send field office staff preliminary copies of these documents, while they are being developed. This will keep the staff informed on the progress of the project and will make it possible for them to make any suggestions they may feel are necessary early in the process.

HUD Field Office Review

In reviewing the documents, the staff will confirm that they conform with the federal regulations regarding the contractor procurement process. The terms and conditions of the energy services agreement will be scrutinized, and the feasibility of the improvements and the proposed financial arrangements will be reviewed. Field office staff will also certify that the General Conditions for Construction (form HUD-5370) are met. After the initial review has been completed, the staff may ask the housing authority for more information, or may approve or disapprove the documents.

Freezing the Rolling Base

The housing authority must write a letter requesting that HUD freeze the rolling base. This should be submitted at the time the energy services agreement is sent to HUD for approval, by the housing authority and the ESCO. The letter should include:

- a description of the buildings included in the project,
- the conservation measures to be installed,

- any changes in fuels or energy source,
- a summary of the contract terms, including the amount to be borrowed, the interest rate and the contract period,
- the energy savings guarantee and financing arrangements, and
- a statement of any maintenance or services to be performed by the ESCO.

The application also should include a copy of the financial summary presented in Figure 10.

Figure 10. Financial Summary

NAME OF HOUSING AUTHORITY: _____

PROJECT NAME(S) AND ACCOUNT NUMBERS: _____

YEAR OF CONTRACT	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
1. ESTIMATED DOLLAR COST SAVINGS													
2. PAYMENTS TO ESCO*													
3. PAYMENTS TO FINANCIER													
4. ESTIMATED NET SAVINGS TO HA													

*Annual fees, e.g. monitoring, training, service charges, etc.

LENGTH OF CONTRACT: _____ YEARS

The summary can be completed by ESCO or housing authority staff. This chart outlines estimated dollar savings, projected debt service and other payments, and net dollar cost savings to the housing authority.

The ESCO must also develop a fuel baseline as outlined in the energy services agreement. This is the level at which the rolling base will be frozen, and includes adjustments for any non-working equipment that will become functional under the contract and adjustments for vacant apartments. (See Chapter 12, "Contract Negotiations.")

Waivers

A waiver from HUD is necessary in cases where the housing authority and ESCO would like to incorporate aspects into the performance contract that are not specifically dealt with in the regulations. This is the case for performance contracts that wish to capture savings from tenant-paid utilities. It is very important to consult with HUD about proposed waivers early in the process. This allows them to realistically structure the performance contract. If the housing authority gets too deep into the process without obtaining HUD

approval for something that needs a waiver, it is at risk of scuttling the performance contract if the waiver isn't granted.

Annual Reporting to HUD

All housing authorities must submit an annual report on actual and estimated utility consumption to the HUD Field Office. Estimated utility cost and consumption data are reported on Form HUD-52722A, which must be turned in annually, along with a summary of the operating budget for the year. Actual utility cost is reported on Form HUD-52722B, which is filed after the end of the housing authority's fiscal year. This form looks at actual versus estimated consumption and then multiplies it by the rate that is in effect at the time in order to determine if the housing authority is eligible for sharing any dollar cost savings from decreases in consumption.

When a housing authority has a performance contract, these forms must be filled out differently than in normal circumstances. The amount of estimated consumption will be that of the frozen rolling base. Normally, actual consumption as reported in the 52722-B form may not be adjusted for heating degree days. With performance contracting, that adjustment is allowed. Any adjustments to the baseline utility use made to satisfy the terms of the energy services agreement should be made to the estimated consumption amount used when calculating the difference between actual and estimated consumption on the 52722-B. That change should also be reflected in the rolling base that is specified in the next year's 52722-A. After completion of the contract, the rolling base level should be determined using the process outlined in Chapter 5, "Introduction to the Performance Contracting Method."

Summary

Performance contracting rules are full of nuances that may affect the success of the project. If a housing authority neglects to notify HUD and doesn't receive the proper approvals, it is at risk of investing staff time and money, only to have HUD refuse to allow some or all of the components of the performance contract it is negotiating. In a worst case scenario, savings it is counting on to repay the debt service may be disallowed. For these reasons, it is vitally important to keep HUD apprised on the progress of performance contracting negotiations and to submit the RFP, energy audit agreement, and the energy services agreement to HUD for approval prior to issuing or signing them.

2. The Additional Subsidy

If a housing authority chooses to pursue a conservation project using the additional subsidy, but no performance contract, it must also obtain HUD's approval for the project. In particular, HUD must review the scope of the project and the expected savings prior to allowing the housing authority to begin the work. The housing authority and HUD must also agree to how the savings from the project will be determined for purposes of meeting the requirements of 24 CFR 990.110(e)(2) which specifies that savings must meet or exceed the amount of annual debt service in order for the housing authority to be eligible for its full share of operating subsidy the following year.

3. The Rate Reduction Incentive

If the housing authority negotiates a decrease in rates, outside of the normal rate making procedure, it is eligible to retain 50% of such savings. In order to retain these savings, it must document for HUD the amount that it would have been paying without its negotiations and compare that to the rate that it is currently paying. Since the rate from its local utility is public information, it should be able to obtain this information from either the utility or its public utility commission.

REFERENCES

GLOSSARY

Actual Savings: The difference in energy use between that which would have been used without the energy improvements and the actual energy used.

Additional Subsidy or Add-on Subsidy: A HUD incentive for resource efficiency improvements in housing authorities. The housing authority obtains non-HUD financing to pay for the retrofit work and HUD provides an additional operating subsidy in an amount sufficient to amortize payments for the loan. The term of the loan is limited to 12 years.

Allowable Utility Consumption Level (AUCL): The level of consumption of fuel, water and sewer usage to be used when budgeting for authority-provided utilities. (using HUD 52722A). The AUCL is computed using the rolling base.

Allowable Utilities Expense Level (AUEL): The estimated level of cost for utilities, computed using HUD Form 52722A, for the upcoming year's budget. The AUEL is computed by multiplying the rolling base by the rates in effect at the time of the budgeting process.

Authority-Provided Utilities: Utilities that are paid for by the housing authority rather than the tenant. Authority-provided utilities may be either master-metered, master-metered with check meters or individual meters.

Block Rate: Refers to a block or step rate structure in utility billing. Energy use is billed at one rate up to a certain amount, and then another rate goes into effect for amounts exceeding that level.

Broker: A customer's representative. In this context, one who represents a utility customer's best interest with respect to finding the cheapest utility rates.

Btu: A thermal measuring system based on the amount of heat necessary to raise the temperature of one pound of water one degree Fahrenheit.

Burnertip: The final point of delivery of fuel in gas-fired furnaces, boilers and other equipment where the gas mixes with oxygen and the flame is produced.

CCF: One hundred cubic feet of natural gas or water. For natural gas, a CCF is approximately equivalent to one therm of energy.

Check Meters: Submetering installed to "check" the energy use of individual apartments in PHAs where master meters record the energy use of the entire building or series of buildings.

CLPHA: The acronym for the Council of Large Public Housing Authorities, whose members manage one-third of the nation's public housing units.

Compliance Audits: Audits required by HUD to be performed on housing authority buildings every 5 years. These audits are regulated by 24 CFR 965.304.

Comprehensive Improvement Assistance Program (CIAP): Modernization funds used by smaller (fewer than 250 units) public housing agencies to correct physical, management, and operating deficiencies and keep units in the housing stock as safe and desirable homes for low-income families. It provides funding for capital improvements, major repairs, management improvements and planning costs. These funds are applied for on a competitive basis.

Comprehensive Grant Program (CGP): Modernization funds used by larger (250 or more units) public housing agencies (PHAs) to make physical improvements to public housing units and improve the management and operation of the PHA. CGP provides funds, based on a formula, that can be used for capital improvements, major repairs, management improvements, and planning costs.

Curtailment: A notice issued by a utility to a customer with interruptible service to stop the use of its product (gas or electricity) during peak usage periods.

Customer Charge: See meter charge.

Demand-side Management (DSM): Utility programs developed to reduce demands on the utilities' generation, transportation, and distribution systems by improving the efficiency with which their customers use energy or shifting the time of energy use.

Energy Performance Contracting: See Performance Contracting.

Energy Savings Guarantee: See Savings Guarantee.

Energy Services Agreement: A written agreement, between a housing authority and an energy services company outlining the work to be done under a performance contract. It must contain the following elements: savings guarantee, scope of work, savings calculation methodology and financing terms. It must be approved by the local HUD office and should incorporate the HUD regulations for performance contracting..

Energy Services Company (ESCO): A company that specializes in managing energy and water conservation retrofit projects. The ESCO may perform any or all of the following services: auditing, developing packages of recommended measures, arranging financing, installing or overseeing installation of measures, tenant and staff education, equipment commissioning, maintenance, measuring, verifying, and guaranteeing savings.

Escalation Rate: A stipulated rate of increase in utility rates used in energy savings calculations and guarantees.

ESCO: See Energy Services Company.

Excess Savings: A positive difference between the amount needed to cover the debt service and other fees involved in a project (usually the amount of the guaranteed savings) and the actual savings. Savings more than cover costs. Excess savings may accrue solely to the housing authority or may be split between the ESCO and the housing authority.

Firm Service: Utility service that is provided to the customer at all times, even during peak usage periods such as very hot or cold weather. The utility is required to have enough capacity and product to serve the customer during these peak periods. The non-interruptible nature of this type of service results in a much higher rate for firm service than for interruptible service.

Fuel Charge: The portion of a utility bill that goes toward the purchase of the fuel (as opposed to the provision of services such as meter reading or line maintenance). The utility is not allowed to make a profit on this portion of the bill and must simply pass through its costs for purchasing gas or electricity to the consumer. It is this portion of the bill that is being deregulated, so that now customers in some areas may shop for energy from suppliers other than their local distribution company.

General Purpose Bonds: Bonds that are financially certified by the entity issuing the bond. Bonds are seldom used for conservation projects because the high fixed costs of issuing this type of financing make it an expensive option for funding the relatively small dollar amounts needed for these projects.

HCDA of 1987: See Housing and Community Development Act of 1987

High Intensity Discharge (HID) Lights: These lamps operate by passing an arc between two electrodes through a quartz or ceramic tube containing small amounts of rare metals. The metals are vaporized and ionized, radiating visible light. The three basic types include mercury vapor, metal halide, and high-pressure sodium.

Housing and Community Development Act of 1987: Laid the regulatory framework for improving the energy efficiency in Public Housing by providing financial incentives for HAs to use non-federal funds for conservation retrofits and by allowing housing authorities to retain a portion of the savings they negotiate for rate reductions.

HUD Form 52722-A: Used by the PHA to estimate utility costs for the upcoming year's budget.

HUD Form 52722-B: Used by the PHA to reconcile actual utility costs with the estimated costs.

HUD USER: An information source, established in 1978 by HUD's Office of Policy Development & Research (PD&R), for Federal Government reports and information on housing-related issues.

Individual Meters: One meter per apartment that can be PHA or tenant accounts.

Interruptible Service: Utility service that is available at a reduced rate because the utility has an agreement with the customer that it can interrupt delivery of service during peak demand periods.

Local Distribution Company (LDC): The local utility company that is responsible for delivering fuel from the transportation company to the customer. Traditionally, LDCs sold and delivered the energy to customers. In areas with deregulated energy services, the LDC may now only be responsible for delivering energy that the customer purchases from a marketer or broker.

Low-Income Weatherization Assistance Program (WAP): A federally-funded program that provides a maximum of $1,600 in conservation services and weatherization assistance to households with incomes of

below 150% of poverty level.

Marketer: A company that buys and re-sells gas and electricity. In areas with deregulated service, a customer may purchase energy from a marketer for delivery by their local distribution company..

Master Metering: One meter per building or a number of buildings, usually a PHA account.

MCF: A unit of measurement for gas or water that is equal to 1,000 cubic feet.

Meter Charge: A flat rate assigned to each utility meter to cover the local distribution companies fixed costs in servicing the account, such as meter reading and billing.

Meter Rate: This rate covers the utility's cost of providing service. It includes operating expenses, taxes, depreciation, and the company's allowed rate of return.

Modernization Funds: Monies provided by HUD (through its CIAP and CGP programs) to PHAs for capital improvements, structural repairs to buildings, conservation retrofits, management improvements, and planning costs.

Normalized Annual Consumption (NAC): The amount of energy that would be used in "normal" weather. Actual usage is normalized for the influence of weather by comparing the weather during the period being analyzed to a long-term average.

Peak Demand: Demand for gas or electricity service during times of peak usage. Usually in extremely hot or cold weather.

Performance Contracting: A mechanism to implement resource efficiency improvements with minimal up-front costs. It uses savings resulting from the efficiency project to pay for the work.

Performance Funding System (PFS): A mechanism by which HUD provides operating capital to PHAs. Under the PFS, each PHA's subsidy is equal to the difference between a formula-determined allowable expense level (plus utility and independent audit costs) and the PHA's projected income (rents, interest on investments, and other locally generated income). A funding system for operating subsidy designed to penalize wasteful HAs and reward thrifty HAs. (24 CFR 990)

Persistence of Savings: Energy or water savings that persist beyond the period initially following the efficiency retrofit into post-retrofit years. Lack of persistence may jeopardize the ability to re-pay loans in performance contracting, unless the ESCO provides a guarantee of savings.

Per Unit Monthly (PUM): Authority-provided utility costs computed per apartment unit per month.

Princeton Scorekeeping Method (PRISM): A utilities billing analysis in which at least 12 months of energy use is regressed against daily average temperatures to estimate the normalized annual consumption (NAC). It provides a measure of analysis accuracy (R^2) and separates heating, cooling, and base-load energy use.

Project-based Utilities: See authority-provided utilities.

Public Utility Commission: A commission that is comprised of state-appointed officials who regulate utilities.

Rate Risk: Dollar savings are calculated by multiplying the change in consumption by the current rate. For a given amount of savings, an increase in rates leads to higher dollar savings and a decrease in rates leads to lower dollar savings. Projected dollar savings may fall short if the rates fall. This is rate risk.

Requested Budget Year: The period of time following the current fiscal year for which the housing authority is developing a budget.

Rolling Base: The rolling base period is the three year interval used to figure baseline utility use when computing the Allowable Utility Consumption Level (AUCL) for a PHA facility. It is an average of the three years actual consumption prior to the current fiscal year.

Savings Guarantee: In a performance contract, a savings guarantee in which an ESCO guarantees that the average energy and/or water savings resulting from the conservation retrofit. The savings guarantee is usually set at an amount equal to that needed to cover the debt service and other fees associated with the project. An ESCO and housing authority may chose to guarantee an amount higher than that needed to cover project costs, especially if the project is estimated to have relatively high excess savings, but may not guarantee less than the project costs.

Section 8: The Section 8 program is designed to increase the housing choices available to very low-income households by making privately-owned rental housing affordable to them. It provides rent subsidies, either rental certificates or vouchers, on behalf of eligible tenants. These subsidies usually equal the difference between 30 percent of the household's adjusted income and the HUD-approved fair market rent (for certificates) or the PHA-approved payment standard (for vouchers).

Section 202: Supportive housing for the elderly. The Section 202 program is designed to enable very low-income elderly (62 years or older) live independently by increasing the supply of rental housing with supportive services. It provides interest-free capital advances to private, nonprofit organizations to construct or rehabilitate rental housing with supportive services. It also provides rental assistance for project residents by paying the difference between 30 percent of their adjusted gross income and the monthly approved operating cost.

Shortfall: A negative difference between the amount needed to cover the debt service and other fees involved in a project (usually the amount of the guaranteed savings) and the actual savings. Savings do not cover costs. The ESCOs savings guarantee should cover this shortfall.

Step Rate: See block rate.

Stipulated Savings: Energy or water savings that are calculated based on mutually agreed upon operational patterns and the manufacturer's stated energy use (or short term measured energy use), rather than long term measured data.

Tariff: The allowed rate to be charged a utility customer. A published, regulated rate schedule.

Tax Exempt Revenue Bonds: Traditional sources of low-interest financing for municipal agencies. Bonds

issued by a tax-exempt entity.

Tenant-paid Utilities: Where utilities are billed through individual meters and the tenants are responsible for paying the bills.

Therm: A unit of thermal measurement that is the equivalent of 100,000 BTUs. Most often used when discussing natural gas and usually equivalent to 100 cubic feet.

Transportation Company: A company that moves and delivers gas or electricity from a generation or production facility to a local utility company.

Unbundled: A term used to describe the more open market for utility services brought on by deregulation. It is breaking up the current energy service package into its three separate parts: supply, transmission and distribution.

Utility Allowance: Per-apartment-unit allowance for tenant-paid or check-metered utility expenses that are set annually by the housing authority using a variety of means. The utility should be set to cover utility costs of a reasonable conserving tenant.

WAP: See Low-Income Weatherization Assistance Program

Weatherization: Improving the thermal integrity of buildings by the installation of energy saving measures or equipment.

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