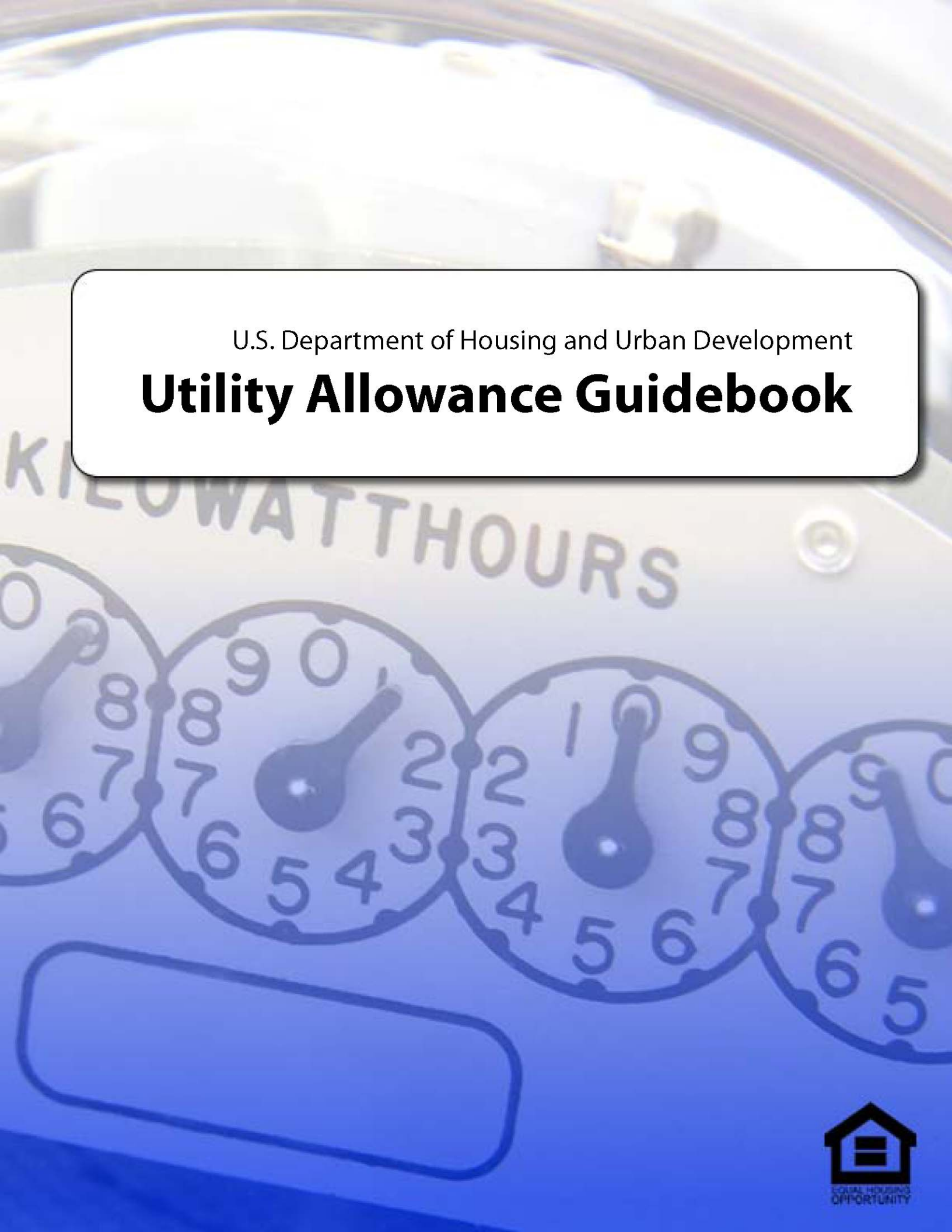

U.S. Department of Housing and Urban Development

Utility Allowance Guidebook

EQUAL HOUSING OPPORTUNITY

UTILITY ALLOWANCE GUIDEBOOK

For Optional Use By
Public Housing Agencies

September 2008

Prepared for:

U.S. Department of Housing and Urban Development
Public and Indian Housing, Office of Public Housing Programs
Management & Occupancy Division
451 Seventh Street, SW
Washington, DC 20410

Prepared Under:
Contract No. C-OPC-22394
Task Order No. DEN-TO003
By
The Nelrod Company
Fort Worth, Texas

EQUAL HOUSING OPPORTUNITY

ACKNOWLEDGEMENTS

This Public Housing Utility Allowance Guidebook was prepared by The Nelrod Company under the U.S. Department of Housing and Urban Development (HUD) Contract Number C-OPC-22394, Task Order DEN-TO003, and through the excellent guidance of **Richard D. Santangelo, Energy Program and Project Manager and the HUD Management and Occupancy Team: John H. Miller, Leroy Ferguson, and Darlene Felton.** The authors want to give a special recognition and extend a special thanks to the following people who provided invaluable contributions:

U.S. Department of Housing and Urban Development (HUD):
Gregory A. Byrne, Public and Indian Housing
Joan DeWitt, Policy Development and Research
Laurence Doxsey, Community Planning and Development
Michael Freedberg, Policy Development and Research
Robert Groberg, Policy Development and Research
Marie L. Lihn, Policy Development and Research
Anna R. Lloyd, Public and Indian Housing
Clamentine V. Melvin, Public and Indian Housing
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Brian Ruth, Public and Indian Housing
Richard L.. Schmehl, Public and Indian Housing
Wayne W. Waite, Field Policy and Management
HUD Field Offices

Other Agencies:
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Special thanks go to all the Housing Agencies that participated in the interview process, data gathering process, and review of draft UA Guidebook with comments.

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INTRODUCTION: Basic Information

OVERVIEW: The purpose of the Basic Information section is to define utility allowances and their importance, and to describe the purpose and use of this Utility Allowance Guidebook.

This Utility Allowance Guidebook replaces the Utility Allowance Guidebook for Optional Use by Public Housing Agencies, 1998.

While use of this Utility Allowance Guidebook (hereinafter referred to as UA Guidebook) is not a regulatory requirement, this UA Guidebook provides Public Housing Agencies (PHAs) with acceptable methods to use in the development of utility allowances (UAs). The U.S. Department of Housing and Urban Development (HUD) continues to allow individual PHAs to develop their own approaches to calculate UAs as long as the method or approach is consistent with HUD regulations found in the Code of Federal Regulations (CFR), Title 24, Part 965 (see Appendix C for a copy of these regulations).

This UA Guidebook focuses primarily on the consumption-based method for calculating computations, and the implementation of consumption and utility allowances (see Chapter 2). The other method, known as the engineering-based method, is discussed extensively in Chapter 3. The Appendix to this UA Guidebook also includes information resources (including websites-Appendix A), sample forms and helpful information (Appendix B), HUD regulations related to Public Housing UAs: 24 CFR 965, Subpart E Resident Allowances for Utilities (Appendix C), as well as a Glossary of Key Terms and Definitions (Appendix D) and a listing of common Acronyms used in this UA Guidebook (Appendix E).

This UA Guidebook is intended for the Public Housing Program. The Housing Choice Voucher Program and other HUD programs also utilize Utility Allowances. However, there are significant regulatory differences between Utility Allowances in this UA Guidebook and other HUD programs. Please do not use Public Housing Program Utility Allowances for other programs.

What Are Utility Allowances?

A utility allowance (UA) is a dollar amount provided to residents to help them pay their utility bills. UAs combine the costs, in dollar amounts, of allowable utilities paid by residents in dwelling units managed by a PHA.

- ***Utility Allowance (cost) – for Resident-paid utilities:*** The cost (dollar) associated with the average resident's reasonable use of utilities that the resident pays directly to utility suppliers.

UAs are based on an estimate of a reasonable amount of utilities consumed by an energy-conservative household of modest circumstances consistent with requirements of a safe, sanitary and healthful living environment [24 CFR 965.505].

Utility Allowances are provided for the following allowable utilities:

- **Electricity** (for space heating, cooking, hot water heating, lighting, refrigeration, microwave, television, computer, and appliances)
- **Natural gas**, **bottle gas/propane**, **fuel oil**, **wood** or **coal** (for space heating, cooking, and hot water heating)
- **Water and sewer** service (sometimes referred to as waste management)
- **Trash and garbage** collection (may also include recycling and landfill charges)

These items will be explained in more detail in Chapter 2: Procedures to Establish Utility Allowances Using the Actual/Historical Consumption-Based Method.

Consumption based UAs are generally determined by multiplying the "average measured amount for utilities use" (i.e., the term "consumption" is commonly used to describe this measured amount) by residents with the utility supplier's current residential rates and charges. Consumption amounts involve different fuel type (e.g., natural gas, propane, etc.) and utility type (e.g., water and sewer, etc.) and are defined in common units of measuring energy or commodity (e.g., gallons, kWhs, therms, etc.).

UAs vary with the physical characteristics of the dwelling units in each housing development, such as building construction type, size of dwelling unit and age of building and equipment. To account for such factors, allowances are grouped and calculated by similar characteristics into categories such as housing developments, sites or Asset Management Projects (AMPs).

The UA amount is usually deducted from the resident's monthly rent. Although for residents whose "Total Tenant Payment (TTP) is less than the utility allowance, the PHA must make a monthly utility reimbursement equal to the difference between the TTP and the utility allowance." (*HUD Public Housing Occupancy Guidebook, June*

2003). A PHA may pay the utility reimbursement either to the resident or directly to the utility supplier as credit on the resident's behalf.

Accurate calculations and implementation of UAs affect both rental integrity and regulatory requirements. In the federally subsidized Public Housing program, a resident's share of rent and utilities should not exceed 30% of the household's adjusted monthly income or 10% of the family's monthly income [24 CFR Part 5.628 (a) Determining Total Tenant Payment (TTP)].

What Are Consumption Allowances?

PHAs who furnish utilities to their residents use consumption allowances as a point of reference for calculating a surcharge amount (based on utility rates charged to the PHA) to bill residents who exceed the determined average usage by other residents in the same housing development and in the same bedroom (BR) size dwelling unit.

- ***Consumption Allowance (usage) – for PHA-furnished utilities:*** The average amount of utilities consumed by a resident that the PHA determines is necessary to cover a resident's reasonable use of utilities that are PHA-furnished. The PHA pays for the cost of utilities. Consumption allowances are used to calculate surcharges for excessive consumption usage (consumption that exceeds the allowance).

The development of the consumption allowances is the same as the development of the consumption base for UAs. Consumption Allowances stop with the consumption average and are implemented differently from UAs.

It is important to remember that if utilities are master-metered (one utility meter for each building) and not individually check-metered, the PHA will not provide UAs or surcharge residents for excess usage, although the PHA may charge a resident a reasonable amount for having an extra freezer or refrigerator.

Why Are Accurate Utility Allowances Important?

The purpose of developing accurate UAs is to fulfill the regulatory requirement of establishing UAs for "a reasonable consumption of utilities by an energy-conservative household of modest circumstances consistent with the requirements of a safe, sanitary, and healthful living environment." UAs should not be unrealistically high or low. UAs that are too high will cost the government and tax payers more money. UAs

that are too low are unfair to residents and may violate regulations. As this is an area in which there has been litigation, it is important that the PHA document and defend the method used to develop the UAs and perform an annual review of the UAs.

The Impact of Utility Allowances on Asset Management

The ability to accurately calculate UAs is a critical factor in a PHA's ability to prosper financially under asset management.

Each property in the PHA's portfolio operates under its own budget, allowing the property to track both revenues and expenses more accurately and to operate more efficiently.

With the rising costs of utilities, it is important that the PHA realize that it does not fully bear the burden of UAs increases, but that the burden is shared by HUD through the operating subsidy calculation.

If the PHA implements energy conservation measures resulting in decreased consumption, the operating subsidy formula currently allows the PHA to retain 75% of the cost savings. Additionally savings may be realized as the PHA can also revise UA schedules for PHA-provided utilities to reflect the reduced consumption.

The Impact of Energy Performance Contracting on Utility Allowances

To encourage energy conservation, HUD has provided two different incentives to PHAs which include resident-paid utilities. One incentive is the called "frozen base" and the other is "add-on". Both incentives require PHAs to obtain financing from non-federal sources to fund utility conservation measures. Both incentives require a PHA to receive HUD field office approval. [Regulations at 24 CFR 990] When approved for the additional subsidy incentive, the PHA is provided additional subsidy eligibility to cover project expenses and debt service for the implementation of energy conservation measures. [24 CFR 990.107 (f)(2)]

Savings are calculated from the difference in UAs determined before and after the conservation measure are implemented. The PHA reduces its rental income by the amount of the savings, which preserves its subsidy eligibility for paying project and debt service cost. The PHA must use at least 75% of the savings from resident-paid utilities toward project expenses and debt amortization. Allowances must not be "arbitrary" or

"capricious" [24 CFR 965.502 (e)] and must reflect the energy conserving behavior of a "household of modest circumstances" [24 CFR 965.505 (a)].

This topic will be discussed further in Chapter 7: Energy Efficiency.

HUD Regulations for Public Housing Utility Allowances Highlights

As mentioned earlier in this introduction, HUD's regulations related to Public Housing UAs are found in 24 CFR 965, Subpart E Resident Allowances for Utilities (see Appendix C). The following items are obtained from these regulations and it is important to keep these in mind as the PHA develops its allowances:

- Units with no check-meters to measure the actual utilities consumption (master-metered) – residents are subject to charges for extra appliances such as freezers and refrigerators. But no UAs are provided [Sec. 965.501(b)];
- Maintain a record that documents the basis on which allowances are established and revised [Sec. 965.502(b)];
- Give residents 60-day notice of proposed allowances and 30-day comment period [Sec. 965.502(c)];
- It is the PHA's objective to calculate allowances for a "reasonable consumption by an energy-conservative household" [Sec. 965.505(a)] and the PHA may choose the complexity and elaborateness of the method used to achieve the foregoing objective dependent upon their housing stock and administrative resources [Sec. 965.505(c)];
- Air conditioning consumption not included in UAs [Sec. 965.505(e)], but surcharge relief can be provided by the PHA through a HUD requested waiver [Sec. 965.508];
- Review at least annually the basis on which UAs have been established (consumption and rates) [Sec. 965.507(a)];
- Revised UAs if there is a change of 10 percent or more from the rates on which such allowances were based [Sec. 965.507(b)]; and
- Notify residents of the option to request individual relief from surcharges for excess consumption for PHA-provided utilities, or from billing in excess of the UAs for resident-paid utilities [Sec. 965.508].

All of the above items are addressed in this UA Guidebook and in detail in the following chapters.

1 Determining the Types of Utility Allowance Study Needed

CHAPTER 1: Determining the Types of Utility Allowance Study Needed

CHAPTER OVERVIEW: The purpose of this chapter is to help PHAs make basic utility allowance decisions, such as:

- **Does the PHA need to conduct a utility allowance update or a new utility allowance consumption study? And,**
- **If a new study is needed, does the PHA want to use the actual/historical method or the engineering method?**

The U.S. Department of Housing and Urban Development (HUD) gives Public Housing Agencies (PHAs) freedom in how they develop allowances (consumption and utility) for public housing dwelling units. Although the federal regulations dictate the various factors that should be taken into account, they do not require that any particular approach or method be used to calculate allowances. Instead, it is at the discretion of the PHA to decide how to establish allowances. The most appropriate approach to choose depends on a PHA's particular characteristics, the information (data) resources and expertise that are available.

Determination of Types of Study Needed

First, the PHA must determine annually if it needs to perform a new consumption study with utility rate adjustments or just an annual review (update study) of utility rates with adjustments, if required. Below are several issues that should be taken into consideration when making this decision:

Consumption Study

A consumption study is recommended if the following conditions exist at the PHA:

- ***Significant Change:*** Review any significant changes to buildings, equipment, or appliances that would affect the consumption requirements of the utility for which the allowance is provided since the time when the allowances were last calculated. Examples of such changes include modernization or weatherization, the installation of space heating or hot water heating systems, the replacement of a large portion of the refrigerators in a housing development. If there have been any significant changes that would affect the consumption requirements of dwelling units, then the allowance consumption amounts for the affected dwelling units should be recalculated.

- ***Time Period:*** Check to see when the last time the consumption allowance amounts were calculated. If these consumptions have not been recalculated in the last five years it is highly recommended (as a best practice) that the consumptions be recalculated to take into account any changes over time that have affected the consumption usage of the dwelling units.
- ***Lack of Support Documentation:*** In addition to the current "Utility Allowance Schedule", check to see if there is complete documentation supporting the method used for determining average consumptions, the utility rates and charges used to calculate the allowances, the actual calculations of the allowances, plus any other documents used in the last study.

Update Study for Ten Percent Rate Change

If the utility rates change by ten percent or more (increase or decrease) compared to the rates used when the current UAs were calculated, then the regulations require the PHA to recalculate the UAs based on the new/current rates and charges.

- ***Change in Utility Rates and Charges:*** Contact the local utility suppliers to gather current rates and charges. Perform a comparison of the new/current utility rates and charges and the rates and charges used to calculate the current UAs. Determine if there has been a change of ten percent or greater in the rate changes and fuel adjustment charges.

Determination Process Diagram: See chart (figure 1) on next page. An explanation of each step in the chart will be addressed in later chapters.

Figure 1: Which Type of Study is Needed?

Which Type Study Is Needed?

Questions

- There has not been any significant changes to the building, equipment, or appliances?
- It has not been 5 or more years since a consumption study was conducted?
- Do you have the support documents used to calculate the last allowances?

If Yes to <u>ALL</u> of the questions above: The PHA is still required annually to review the rates and charges of which the last allowances were calculated. (*Skip Chapter 2 & 3 methods for calculating consumptions, and continue with Chapter 4 & 5 to gather current rates and calculating allowances).*

Annual Review-Update Study

- Utilize average adjusted consumptions from previous study
- Gather current utility rates and charges
- Compare current utility rates and charges with previous study
- Adjust utility costs if there has been a 10% change in rates and charges
- Approve and adopt new or current Utility Allowance

If No to <u>ANY</u> of the questions above: Read chapters 2 & 3 to determine which method to use and following the process. Then utilize Chapter 4 & 5 to gather current rates and calculating allowances.

New Consumption Study

- Gather new 12-month history of utility usage for each applicable utility
- Gather current utility rates, charges, and local climatic weatherization data
- Develop consumption averages for each applicable utility
- Calculate utility costs – Utility Allowance Schedule
- Approve and adopt new Utility Allowances

Next, the PHA must determine which staff member(s) will be assigned the task to either develop the new average consumptions and/or calculate UAs and/or perform the annual review and update of the UAs if appropriate.

Determining the Method to Use if Performing a Consumption Study

There are two primary methods for determining consumption allowances, the Actual/Historical Consumption-Based Method and the Engineering-based Method. The **Actual/historical Consumption-Based Method** considers the amount of utilities residents living in similar dwelling units ***have consumed within a specific billing period in the past***, and the **Engineering-Based Method** is a projection of the amount of utilities people living in similar dwelling units are ***expected to consume within a specific billing period.*** These two methods are explained further below and in the following two chapters.

Actual/Historical Consumption-Based Method Overview

The amount of actual utilities consumed by residents is recorded by individual residential (retail) utility meters. This method typically uses a sampling of residents' utility bills or billing records (usually for 1 to 3 year period, from the utility supplier) to determine monthly utilities consumed by residents in similar dwelling units within a housing development. The PHA determines the similarity of dwelling units by assessing the building type (e.g., apartment or walk-up, row house or townhouse, semi-detached duplex, detached house, etc.) (See Appendix B for descriptions of each building/structure type), important architectural features (e.g., wood siding or brick, single story or multiple stories), bedroom sizes, the condition, maintenance and efficiency of the installed heating/cooling equipment, and household appliances. These *physical characteristics* must be considered when determining reasonable (fair) amount of utilities consumed by residents. PHA staff can be trained to develop consumption allowances (the average amount of utilities consumed by a resident that is necessary to cover a resident's reasonable use of utilities) using an actual/historical consumption-based method since it uses readily available information (commonly known as "data") and straightforward arithmetic calculations.

There are pros and cons to utilizing an actual/historical consumption-based method.

Pros:

- Method requires less information research and calculations;
- Actual consumption records can usually be obtained from most local utility suppliers for little or no cost;
- Does not require special software;

- Does not require advanced technical skills;
- Actual consumptions should include the lifestyle issues of residents living in a particular housing development and bedroom size.

Cons:

- *Cost* - In recent years, some utility suppliers have been imposing fees for providing historical data to housing agencies.
- *Privacy Issues* – Residential utility usage and cost information is considered private information, and the utility supplier may not release the information without a signed release form with account numbers and the signature of the person listed on the account. Some utility suppliers require the use of their own authorized form for release of information.
- *Time Consuming* – Most PHAs do not have signed resident release forms readily available. Therefore, hours of staff time could be involved in obtaining the releases from as many residents as possible; presenting the forms to the utility supplier; and obtaining the actual historical consumption data from the utility suppliers. Since most utility suppliers provide the data to their customers without charge, as a courtesy, they tend to take their time returning the consumption data to the PHA. Often the data is in a non user friendly format, making it difficult to work with.
- *Incomplete Data* - Sometimes data is unavailable for an entire housing development or for certain bedroom sizes. Often historical data received has less than a 12-month consumption history, (12 months is the preferred timeframe). This may be due to disconnects, vacancies, utility service being in the name of someone other than the head-of-household, etc.
- *Efficiency/Costs* – For medium to large agencies, multiple staff may be involved in the gathering, sorting and calculation of consumption averages. This can result in additional staff time due to communication or lack of understanding to the importance of the task.
- *Deregulation of utility suppliers and large jurisdictions* – In deregulated states, PHAs may have to contact and work with multiple electric and natural gas utility suppliers. Additionally, larger states such as Texas, California, Arizona, and Illinois have many PHAs with jurisdictions covering multiple cities/towns, counties, metropolitan areas, and regional areas. This often results in multiple utility suppliers servicing an area. Dealing with multiple utility suppliers can be difficult. They often have their own individual privacy rules and rate calculations.
- *Removal of air conditioning consumptions* – As required by HUD regulations. This can be a difficult task since utility suppliers provide consumption data in

a lump-sum format and not by end-use (e.g., space heating, cooling, cooking, hot water heating, etc.). Removing the air conditioning portion of usage may requires a complex engineering calculation to determine the amount of electricity used by a dwelling unit for central or window unit air conditioning. Sometimes it is difficult to determine dwelling units which are air conditioned, especially when resident furnish there own window air conditioners. See Chapters 2 and 3 for more details on removing air conditioning consumption.

Engineering-Based Method Overview

An engineering-based method relies on engineering calculations and assumptions. It utilizes standardized consumption information for energy using equipment such as: heating, air conditioning, and appliances. This method considers utilities consumed due to building performance (e.g., energy usage or efficiency), utility end-uses (e.g., electric heating, electric cooking, electric water heating, etc.), and heat loss (e.g., insulation levels) and energy type. Accuracy requires detailed information about buildings and the utilities consumed. This method utilizes data from historical studies (weather information) and engineering models to compute consumption used. Engineering-based allowances should be compared to actual utility bills to determine if the projections measure up to reasonable allowance levels.

When utilizing an engineering-based method, specific technical information and building characteristics of housing developments/dwelling units must be gathered. This includes air leakage, duct leakage, insulation levels and insulation, window types, etc.

There are pros and cons to utilizing an engineering-based method.

Pros:

- This method focuses on what consumption usage should be, thus promotes energy-conservative behavior;
- Method does not require time consuming process of gathering personal utility use data from residents. Beneficial to larger PHAs with large number of dwelling units;
- Limited sampling consumption data or missing consumption data is not a concern;
- Technical information and data needed to model consumption usage can usually be found on the internet;
- Provides a method for removal of air conditioning consumption since utility companies provided usage in a lump sum format;

- This method can be utilized in conjunction with the actual/historical consumption-based method.

Cons:

- Information regarding standardized consumption for energy using equipment such as: heating, air conditioning, and appliances, is not always readily available;
- Gathering technical information and data can be very time consuming;
- Often assumptions (guesses) must be made as to reasonable consumption usage, such as resident lifestyle issues (e.g., length of time resident spends in dwelling unit, number of appliances and how often appliances are used, etc.);
- The difference between consumptions developed by engineering approach and actual consumption usage can be great;
- Not all PHAs have trained personnel in building science and energy consumption measures to properly gather building, facility, equipment, and other data needed for accurate engineering calculations;
- Not all PHAs are trained or licensed to use an acceptable energy consumption software program to determine accurate consumptions.

Selecting a Method for Determining Consumptions

Either method implemented properly can be used by smaller PHAs due to the small number of dwelling units. However, availability of staff, and lack of skills necessary to complete a study can be a determining factor.

An ***actual/historical consumption-based*** method works well for a majority of the PHAs across the nation. Most PHAs base their UAs on recorded actual historical utility data. This method requires no special software and does not require advanced technical skills. Because it focuses on recent information (data) from residents' utility accounts, using this method generally reflects changes in the condition of the physical dwelling units (deterioration or improvements), in space heating and water heating equipment operation, and in resident population and behavior (lifestyle). In addition, as public housing is transitioning to asset management, the calculation of UAs by averaging actual historical utility data is in agreement with this transition.

Calculating allowances using a history of residents' consumption data does not prohibit also using engineering calculations. On the contrary, engineering-based calculations are often used in combination with actual historical consumption usage to separate the utility end-uses (e.g., gas heating, gas cooking, and gas water heating) or to provide a

basis for determining allowances where actual historical data is not available. If the process is performed properly, there should be similarity in the results (average consumption totals) for the consumption-based method and engineering-based method.

A properly executed ***engineering-based method*** may be the best method for the larger PHAs due to their large number of dwelling units (some in the thousands) and the number of utilities paid by residents. **Those PHAs with the capacity and resources should check the consumption allowances developed using engineering calculations, against actual historical utility data.**

Not all PHAs have personnel trained in building science and energy consumption measures to properly gather building, facility, equipment, and other information needed for accurate engineering calculations. Not all PHAs are trained or licensed to use an acceptable energy consumption software program to determine accurate consumptions. This should be considered when determining if the PHA is capable of completing the study in-house.

The next two chapters provide a detailed process to calculating UAs using each of these methods mentioned above.

Other Considerations

For many medium, large and very large PHAs (with a numerous housing developments containing hundreds and thousands of dwelling units, and with many bedroom sizes), the task of developing consumption and UAs can be very difficult and time consuming.

Some PHAs may prefer to explore third-party options to assist in the development or update their UAs when utilizing the engineering approach due to the higher degree of building science knowledge that is required.

Third-party participants might include, but not be limited to: qualified engineering firm; certified energy home rater; certified energy manager, energy audit firms, and energy services companies (ESCOs), energy services providers (ESPs), Home Energy Rating System Providers (HERS), etc.

An important aspect of selecting a third-party is to follow [24 CRF 85.36] the PHA's written Procurement Policy procedures. Since the procedures may require the preparation and distribution of a Request for Proposal (RFP), a Request for Quotation

(RFQ), or Quotation for Small Purchase. Sample RFP and RFQ documents are provided in Appendix B.

2

Procedures to Establish Average Total Consumptions and Utility Allowances Using the Actual/Historical Consumption-Based Methodology

CHAPTER 2: Procedures to Establish Average Total Consumptions and Utility Allowances Using the Actual/ Historical Consumption-Based Methodology

CHAPTER OVERVIEW: This chapter provides a step-by-step process to apply an Actual/Historical Method when developing consumption and utility allowances. Nine steps are provided to determine the average utility consumptions. After the average utility consumptions are developed they are applied to the utility rates and charges to calculate the new utility allowances as explained further in Chapter 4, Calculating Utility Allowances.

Allowable and Non-Allowable Utility Consumptions

Before beginning the task of establishing utility consumption, the PHA must understand the definitions of allowable and non-allowable utility consumptions.

Allowable Utility Consumptions

HUD has determined that only services that are essential for a "safe, sanitary and healthful living environment" are allowable and that all of the *allowed* uses are limited to those who are the legal occupants of the dwelling. Providing housing for long-term visitors and/or doing something that causes unreasonable consumption that will be reflected in the calculation of consumption data (e.g. washing other people's laundry, washing cars, filling swimming pools, etc.) is not allowable. The PHA should provide consumption and utility allowances (UAs) for the following utility end-use categories:

- Space heating
- Cooking
- Hot Water heating
- Water
- Sewer
- Trash/Garbage collection
- Lights and approved appliances/equipment

The following paragraphs provide a more detailed explanation of the above allowable utilities.

Space Heating and Cooling

Heating a dwelling to maintain interior temperatures of 68°F to 72°F continues to be the standard of a healthy living environment. **Air conditioning is not included in the utility allowance for Public Housing residents** unless a HUD waiver is granted (e.g., designated elderly developments in severe heat climates) [HUD Regulations 24 CFR 965.505(e)]. If the dwelling unit has central air conditioning the resident should have the choice of not utilizing the air conditioning system. Residents with PHA-provided master-metered utilities will be surcharged for the use of air conditioning. Resident-paid utilities will not include air conditioning in their UA. In either case, the PHA may grant relief if a waiver is received from HUD for individual relief [24 CFR 965.508].

Sanitation

Water that is consumed for hot water heating, bathing, and electric appliances used for laundry (clothes washer and/or dryer), cleaning house, and cleaning dishes is allowed. Water and sewer charges, waste and garbage removal (including recycling) are also allowable utility costs.

Health

Electricity for appliances used for food preparation (stove, microwave, toaster, mixer, etc.) and electricity for lighting and ventilating are allowable utility costs. Gas, fuel oil, coal or wood used for cooking are also allowable utility costs.

Other Electric Appliances

The other electric appliance category includes minor household appliances or equipment used by residents. As examples of other electric, regulations allow for a microwave, radios, televisions, and computers as minor items of electric equipment. These items are considered recreational and communications use of electricity and our society's norm for the use of minor items of equipment has been increasing rapidly. "The resident lease must state the utilities, services and equipment that will be supplied by the PHA without any additional cost, the utilities and appliances that will be paid or directly supplied by the resident, and the utility allowance for resident-paid or PHA-supplied utilities and appliances." (*HUD Public Housing Occupancy Guidebook, June 2003*). It should be noted however, that PHAs still retain the responsibility for determining the reasonable amounts of utilities used by residents.

Non-Allowable Utility Consumptions

HUD has determined that air conditioning; telephone service, cable TV, satellite TV subscription and internet services are all non-allowable utility costs.

Additionally, some residents may have in their dwelling units an additional refrigerator and a separate freezer appliance. These appliances use additional electricity and the residents will not be compensated for their use. For PHA-paid electric utilities, the PHA should surcharge those residents with an additional electric appliance(s) based on the average amount of kilowatt hours those appliances are expected to use. For estimates of residential consumption of electricity by end-use, see Appendix B or visit The Department of Energy's (DOE) website at http://www.eia.doe.gov/emeu/recs/recs2001/publicuse2001.html.

Air Conditioning

Air conditioning is a common example of a utility cost that is non-allowable for Public Housing residential dwelling units. Air conditioning can be supplied through a central system or a window unit(s). The following paragraph discusses some options the PHA might take to remove this non-allowable utility consumption.

To remove the air conditioning usage from the actual/historical data for housing developments where only some of the dwelling units have window air conditioning units, the PHA may simply want to delete from their data those dwelling units with window air conditioners.

A PHA may want to compare the actual/historical consumption used during the hottest summer months to those months just before and after (shoulder months) those hottest months. The hottest summer months would most likely include air conditioning usage. If the hottest months are significantly higher than the shoulder months the PHA may want to remove the hottest months and average the shoulder month's consumption to use as the base electric consumption.

For those PHAs with central air conditioning installed in the entire housing development or with window air conditioner installed in every dwelling unit, the process of removing non-allowed air conditioning consumptions is more difficult. An engineering calculation process is needed. This process will be discussed in Chapter 3.

Individual Relief

Elderly, disabled or ill residents with additional equipment or appliances that are necessary for their well-being do not necessarily fall under the non-allowable consumption category. Residents with these special needs can request relief, from the PHA, from surcharges for excess consumption of PHA-provided utilities, or from

payment of the utility supplier billings in excess of the UAs for resident-paid utilities (see Chapter 6 for more details on Individual Relief.)

Developing Average Total Consumption Using the Actual/Historical-Based Consumption Method

This process involves the steps listed below. Each step is explained in more detail in this chapter. These steps demonstrate how the overall approach represents a **"best practice"** for establishing allowances based on a history of resident's actual utility consumption records.

Step 1	Obtain Information Release Forms from Residents
Step 2	Identify Timeframes for Consumption Data Collection
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Note that in the following steps "PHA" is used to refer to both the housing agency and/or a designated staff member of the agency.

Step 1. Obtain Information Release Forms from Residents

The purpose of this step is to develop a strategy and procedures to obtain data from utility suppliers by first obtaining a proper release of information form signed by each resident.

Residential utility use and cost information is considered private information, and most utility suppliers (especially electric and natural gas) will not release the information to a third-party without a signed release form with account numbers from the resident head-of-household or person named on the account. Some utility suppliers require the use of their own authorized form for release of information. Sending letters to residents or contacting residents door-to-door to get their release form signed generally results in insufficient participation. A more effective way to collect the release form is at the Lease signing or during recertification process. As part of the Leasing process, the

PHA can ask residents to sign a *release of information form* as described above. The PHA should contact the local utility suppliers to verify their requirements for collection consumption information. (See Appendix B for sample Resident Release of Information Form the PHA can modify and utilize.)

An alternative method could be to make a single form (like a petition) with all the dwelling units listed, and with all needed signatures and account numbers listed. This may eliminate the need for a separate form for each dwelling unit when sending the documents to the utility supplier. Please check with local utility suppliers to determine if this method is acceptable.

After the release forms have been collected the PHA should sort the forms by development and then by bedroom size. The utility supplier will generally provide the reports in the same order as the release forms; therefore, this will help expedite the sorting process of the consumption reports when they are received. Often PHAs will also send a copy of a resident address list (sorted by development and bedroom size) along with the request. This will also help the utility supplier determine which reports to run. The PHA should prepare a request letter, on PHA letterhead, to the utility suppliers. This letter should request consumption history for the nearest 12-month period for each of the accompanying signed Release of Information Forms.

Step 2. Identify Timeframes for Consumption Data Collection

In this step the PHA identifies time periods for which the data will be collected either from the utility suppliers or the PHA's meter reading records.

Accurately calculating utility consumption amounts from actual utility data depends upon using information gathered from a full 12 month cycle, which includes all seasons. When requesting the historical data from the utility suppliers or gathering check-metered utility readings, the most recent 12-month period is preferable.

Where data is limited due to comprehensive modernization, a new housing development, or other reasons, the PHA may include data from earlier years or use an engineering-based method to determine the missing information. (See Chapter 3)

Step 3. Understand the Different Data Types and Collection of the Data

This step identifies the different data types needed to conduct a UA study and gives helpful guidance in collecting data from each resource. A brief description of each data type is provided below.

Utility Consumption Data

Utility consumption data is one type of data a PHA must collect. Actual consumption data for resident-paid utilities are provided in the form of utility billing records from the utility supplier, while actual consumption data for PHA-provided utilities is gathered from individual utility meter readings. PHAs with individual check-metered utilities should read the check-meters at regular intervals, preferably every month, although some PHAs choose to read check-meters bi-monthly or quarterly. Often check-meters are read by the utility suppliers and the records are made available to the PHA.

If the PHA does have the utility consumption data readily available, it must request that data from the local utility suppliers (see Step 1 for guidance). Calculating accurate allowances requires access to utility data for as many dwelling units as possible. Therefore, the goal of the PHA should be to obtain consumption data for all the dwelling units in an allowance category (housing development, housing project, or AMP).

Prior to the calculation of average consumption totals, the PHA should review the utility supplier's metering method and ask the following questions: What does the utility supplier do when it cannot read a meter? Does the utility supplier use estimated readings? What is the common unit of measuring consumption? How often does the utility supplier read meters? What is the pattern of meter reading dates? Answers to these questions will be critical in determining how the PHA will calculate UAs for its housing developments.

The PHA must calculate average monthly consumption totals by bedroom size and development (or AMP) from the collected utility consumption data. Calculations must include each utility type (e.g., electricity, natural gas, water, etc.) that is resident-paid or PHA-provided. The PHA will use this calculated average consumption amount as the base on which it will calculate the UAs using local utility supplier's current rates and charges. These utility consumption bases will also serve and the Consumption Allowances for check-metered utilities paid by the PHA.

Utility Rates and Charges Data

Residential utility rates and charges are utilized in the calculation of UAs. Gathering utility rates and charges is not always an easy task.

The PHA must gather and document all residential utility rates and charges currently in effect and those approved with future effective dates within the next year, paying special attention to applicable taxes. The process of gathering the applicable utility rates and charges is discussed in more detail in Chapter 4: Calculating Utility Allowances.

Additionally, the PHA should collect one actual billing record (sample residential utility bill) for each utility supplier to use in the verification of appropriate rates and the utility supplier's calculation process. Many utility suppliers have complicated calculation methods, so a cross-check with a sample residential utility bill is a good Quality Control (QC) process. Other useful information to inquire about or gather includes:

- Does the utility supplier have a reduced rate schedule which is available to all low-income families?
- Does the utility supplier provide the option of a uniform payment plan?
- Is the selected utility supplier billing reasonable rates and charges, as compared to other local utility suppliers for the same fuel?

Housing Occupancy Data

The PHA will need to gather housing occupancy data in order to make decisions regarding adjustments to the actual consumption data before calculating accurate average consumption totals. The following items should be obtained and the information should be sorted by housing development (site, project or AMP) and by bedroom size:

- Address list of all dwelling units;
- Address list of Over-Housed and Under-Housed residents (sometimes contained in PHA's "transfer list");
- Address list of vacant dwelling units.

The collected lists will assist the PHA in removing the less than ideal sample consumption records due to higher or lower number of occupants in a dwelling unit and inadequate or incomplete billing data due to vacancies.

Air Conditioning Consumption Data

As mentioned previously in Chapter 1, air conditioning (A/C) is a non-allowable utility cost for Public Housing residential dwelling units. Therefore, either the air conditioning

consumption amount will have to be removed from the total electric consumption amount (i.e., for central air conditioning or window A/C units in all dwelling units) on all PHA-furnished air conditioners. Some PHAs allow resident-furnished window air conditioners. This can affect the validity of the sample and cause an overstatement of utilities, especially if over 10 percent of the dwelling units in the development have resident-furnished window air conditioners. In this case, the PHA may remove consumption averages for units with air conditioners from the sample. If the PHA removes these from the sample, the PHA should document which dwelling units were removed and why.

Optional: Climate Data

The PHA has the option to adjust the averaged consumption totals to account for future significant weather changes. If the averaged consumption totals are adjusted for climatic changes, the PHA does not have to perform an actual consumption study each year due to extreme weather changes. This climatic adjustment uses the Heating Degree Day (HDD) data (see Glossary) gathered from the National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center website: www.ncdc.noaa.gov. This data is available by publication for weather center locations throughout the United States. Most locations have 30-year average HDD data as well as the current year average HDD data. This is the best information to use for this adjustment.

Step 4. Define Utility Allowance Categories

This step provides guidance in identifying which categories need to be included to accurately calculate UAs.

There are many items to consider when categorizing UAs. Some methods of defining categories are more complex and other more simplified. Either method is acceptable. The more complex methods might include allowances based on the location of the unit in the building (e.g., inside unit, end unit, etc.) whereas the simplified method averages all units in the building by bedroom size.

PHAs can categorize and calculate their allowances by grouping them as follows:

- First by PHA housing development (site, housing project or AMP). The units have the same weather conditions, and generally have similar appliances and use the same fuels;
- Second by utility type provided (e.g., electric, natural gas, water, etc.);

- Third by building/structure type (e.g. row house, detached house, etc.). These have similar energy usage; and
- Fourth by each bedroom size (similar number of occupants).

Separating utility data by these categories listed above will provide the residents with unique and more appropriate allowance.

As indicated above, if a housing development has more than one building/structure, they should be grouped separately (See Appendix B for a listing of building/structure types and a common description of each).

Step 5. Assess the Data Report Format and Information Provided

This step assists the PHA in identifying how the data reports are formatted (e.g., by dwelling unit or by month) and other important items to look for, such as which column has the consumption data, what is the measure for the utility reading, and does the report contain the most recent 12-month period.

After the PHA has obtained the consumption history reports from the utility supplier, copies of residential utility bills, or records of meter readings, it should then review these documents to see what format was used to provide this data. The format of the consumption report documents can vary from one source to another. These reports can contain much more information than is needed to develop UAs. It is important to assess the information provided before sorting and calculating consumptions. The two most common formats provided by the utility supplier are: 1) a separate page report for each dwelling unit address or 2) a multi-page report listing one particular month's readings for all dwelling unit addresses, then the next month's reading for all dwelling unit address, and so on. The easiest and fastest format to work with is a separate page report for each housing unit address with the complete 12-month history of consumption used listed in columns by the appropriate billing date. This format also makes it easier to sort the data by allowance categories. The other format can also be utilized, but it is more challenging to use and may require creative steps to organize and sort data. If the PHA is working with a copy of 12 monthly utility bills from each resident, it may also want to utilize a spreadsheet to organize (see Table 2-2 later in this Chapter for example) and sort the data into an easier format for calculating average consumptions.

It is important to look for and understand the following items on the reports or records before attempting to calculate the consumption allowances:

- which column provides the monthly consumption amounts needed to calculate consumption averages;
- what is the utilities common unit of measuring the consumption amount provided? Electricity is simple since consumption is always in kilowatt hours (kWhs). Natural gas can be listed in terms, cfs or ccfs. Water can be listed in gallons, 1000 gallons, ccfs, etc.
- which dates listed document the most recent 12-month period?

Step 6. Sort the Data into Allowance Categories

This step provides assistance in separating the data reports into the allowance categories determined in Step 4, previously discussed, and suggests what to do when problem data is observed during the sorting process.

The PHA should now sort or group together the utility bills or billing reports by hand according to the allowance category. The order of sorting the allowance categories may be first by housing development/site or AMP, second by utility type (e.g., electric, natural gas, etc.), third by building type (e.g., row house/townhouse, semi-detached/duplex, etc.) and fourth by bedroom (BR) sizes.

Sorting of consumption data, provided for all dwelling units by month, is more difficult and the PHA may wish to enter the data into a spreadsheet table to help organize (see Table 2-2 later in this Chapter for example) and sort into allowances categories before calculating average consumptions.

Table 1 (below) provides two examples of the allowance categories that would be necessary for two different housing developments and the number of separate utility calculations that will be necessary for each housing development.

Table 2-1: Allowance Categories for Two Developments *(for illustration purposes only)*

XYZ Family Development (6 UA calculations) (Semi-Detached/Duplex)	**ABC Elderly Development (4 UA calculations) (High Rise)**
3-BR gas heating, gas cooking, gas water heating	2-BR all electric appliances
4-BR gas heating, gas cooking, gas water heating	3-BR all electric appliances
3-BR electric lights and appliances only	Water
4-BR electric lights and appliances only	Trash
Water	
Trash	

During the sorting process the PHA should flag (e.g., mark, tab, separate, etc.) any particular report or record which indicates one or more of the following problems with recorded data:

- Less than 12-months history of recorded consumption data;
- A "0" consumption amount or significantly low consumption amount for one or more months;
- An excessively high consumption amount for one or more months.

Any of the problems listed above would serve as a good reason for eliminating that particular dwelling unit's consumption history report from the sample that will be used to calculate the average consumption amount used for that allowance category.

Step 7. Determine the Sampling Size Needed

This step provides assistance in identifying and eliminating problem data (like those tabbed in Step 6 during the sorting process), and how to determine if the data sampling is adequate.

In order to accurately determine UAs, the sampling of residents' utility bills or billing records should include the *complete* data for *all* dwelling units for each UA category. This is not always possible due to inaccurate, missing, or questionable data reports (i.e., containing problematic data). To make sure that the sampling is consistent, the PHA should eliminate those records or reports with problematic data before calculating the average consumption totals.

The statistical validity (accurate representation) of the sample focuses on determining whether the number of dwelling units in the sample will provide an accurate calculation of consumption used by dwelling units in that UA category. This is generally not a problem if there are a large number of dwelling units in a particular UA category, but may be a problem if the number of total dwelling units is small.

There are two basic reasons why a PHA might not be able to use the data from *all* dwelling units for each UA category.

- Data is inaccurate due to meter reading error, data entry error, missing data for one or more months, or questionable amount (e.g., abnormally low or high).
- The PHA does not have the resources to enter the data from all dwelling units into spreadsheet tables. This could be especially true for PHAs with a large

number of dwelling units. This might not be an issue if data is imported into spreadsheet tables electronically, but may be an issue when all consumption data is input by hand.

Eliminating dwelling units with problematic data ensures all data in the sampling is consistent but, by definition, also reduces the number of dwelling units used to calculate consumption and the UAs. The elimination process can take place during the sorting process (as mentioned earlier in Step 6) and/or after the data has been placed in a spreadsheet table (see Table 2-2 later in this Chapter for example).

Eliminating Problem Data from a Spreadsheet Table

The first, and easiest, approach is for the PHA to eliminate from the spreadsheet table any dwelling units that have data problems or questionable data. For example, the PHA may want to eliminate data on any dwelling units that have estimated (rather than actual) readings that have not been corrected by subsequent meter readings. This will ensure that the consumption data for the period represents actual consumption and is not an approximation of actual experience. The PHA may also decide to eliminate data for all dwelling units that changed hands in the middle of the year, underwent major renovation during the year, or were vacant for more than one month during the year. A PHA that decides to eliminate data may either eliminate the entire dwelling unit from the analysis or eliminate only those months that have problem data. (See Table 2-2 later in this Chapter for example)

Eliminating Data Due to Limited PHA Resources

A large PHA that has, for example, 5,000 2-bedroom apartments will have a labor intensive task to manually enter all dwelling units and their respective consumption records for gas, electric, and water into spreadsheet tables. Since the PHA has a large sampling, it could reduce the amount of the study sampling by selecting a percentage of the dwelling units to calculate the consumption averages.

To ensure an adequate sample the PHA should be sure that:

- The dwelling units selected for inclusion are randomly selected in all bedroom sizes rather than selected for their characteristics. A PHA can select every 10th dwelling unit, every 14th dwelling unit, or every 20th dwelling unit, etc.
- Enough dwelling units are included in the sample for the PHA to think that the UA consumption calculated reflects overall consumption. A common practice is to make sure the sampling used meets the 95 percent confidence level with a +/-5 confidence interval. There are numerous resources available online

that a PHA can use to calculate the minimum sample size a PHA should have if its wants to use a sample and meet these sampling criteria.

Step 8. Calculate Typical Consumption Averages

This step provides the PHA with examples of how to calculate the consumption averages for each allowance category.

The next step is to determine typical consumption. Adding up all the monthly consumption amounts (12 months worth), and then dividing the total by the number of records (12) to determine the average consumption for that utility category. Where averages are for periods other than months, these averages should be converted to monthly amounts.

In the case of the individual consumption 12-month history report provided by dwelling unit address, the PHA does not have to enter the monthly consumption data into a spreadsheet to calculate the average monthly consumption total for each address. The PHA can simply use a calculator to add together the 12 monthly amounts and divide that total amount by 12 (one full year). The total average monthly consumption for that address can be neatly written right on the copied documentation. The PHA would repeat this process until all calculations are complete for each address in that category. When the PHA comes across a flagged report it should be pulled out and not calculated into the average, but places it in the back of the other reports for that allowance category.

For consumption data provided on monthly documents for all dwelling units the PHA should create a simple spreadsheet table using Microsoft Excel software or other comparable spreadsheet software. (See example chart on next page.) The spreadsheet tables should include the data for all like dwelling units. The data should be arranged in columns for ease of calculating. The first column should contain the dwelling unit number or address. Next there should be a separate column for each of the twelve months. Following that there should be a column for the 12-month totals and a column listing the number of months calculated. The last column should be for the total averages. This format will assist the PHA in sorting and calculating the consumption averages for each utility category. The first row should contain the type of information in each column (header row). The rows following the header row should list each unit and its related consumptions. The final two rows should contain the calculated total of each column with consumption figures and the total average of each

column with consumption figures. In cases where the utility amounts are charged annually (e.g., propane, fuel oil, etc.) the table will have a single column.

For check-metered utilities paid by the PHA, these consumption averages serve as the Consumption Allowances for which the PHA will surcharge residents who exceed these amounts (utilizing the utility rates charged to the PHA by the utility supplier). See example below.

Table 2-2: Sample Spreadsheet Layout *(for illustration purposes only)*
1644 Main Street – ABC Elderly Development – 2 Bedroom Units

Unit #	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Jul	Aug	TOTAL	# of Mos	Average
Apt 1	60	80	80	90	190	140	90	100	60	60	80	60	1,090	12	90.83
Apt 2	60	80	100	100	200	140	100	80	60	60	80	60	1,120	12	93.33
Apt 5	80	98	90	100	200	120	120	98	60	60	80	60	1,166	12	97.17
Apt 6	60	80	100	100	200	180	100	80	55	43	60	55	1,113	12	92.75
Apt 7	60	80	100	100	200	150	100	80	60	60	80	60	1,130	12	94.17
Apt 11	70	90	104	110	202	180	104	90	60	70	60	60	1,200	12	100.00
Apt 12	70	90	105	110	202	160	105	90	60	70	60	60	1,182	12	98.50
Apt 15	70	90	104	110	202	160	104	90	60	70	70	60	1,190	12	99.17
Apt 19	70	90	104	110	202	180	104	90	60	70	60	60	1,200	12	100.00
Apt 22	66	90	104	110	202	180	104	90	46	80	60	46	1,178	12	98.17
10-Unit Total	666	868	991	1040	2000	1590	1031	888	581	643	690	581	11,569	12	964.1
10-Unit Average	66.6	86.8	99.1	104.0	200.0	159.0	103.1	88.8	58.1	64.3	69.0	58.1	1,157	12	96.4

Step 9. Adjust Consumption Data Utilizing a Spreadsheet

This step provides guidance on how to adjust the calculated average consumption totals for future significant weather changes and therefore reduce the annual recalculating of the consumption allowances. It will also provide steps to eliminate the high-users and low-users, thus providing the resulting "estimate of a reasonable consumption of utilities used by an energy-conservative household", as required by HUD regulations.

There are several reasons for adjusting the consumption data:

- PHA does not have an adequate number of data reports for a particular bedroom size in an allowances category (e.g., electric, natural gas, etc.) at a housing development due to inaccurate, missing, or questionable data.
- PHA does not want to calculate average consumptions each year therefore they choose to climatically adjust the consumptions.
- To develop allowances based on an "energy-conservative household", as required by HUD regulations.

Adjusting data begins with reviewing the consumption data entered into spreadsheet tables for each UA category.

Adjusting Problem Data

There are basically two approaches for dealing with, or adjusting problem data: (1) eliminating problem data and, (2) revising problem data. It is always a good idea to include a record of any changes you make in data along with the date such changes is made.

Eliminating Problem Data

A PHA that decides to eliminate data may either eliminate the entire dwelling unit from a spreadsheet or eliminate only those months that have problem data and divide the total by less months. When only partial data is eliminated (e.g., for 3 consecutive months) for a dwelling unit, it is important that the averages (or medians or modes) are also based on this reduced data set (total number of months = 9). In this case the average utility consumption for these three months is based on nine months, rather than 12 months. Please note that if the three months are in a high volume or low volume season (e.g., summer or winter) this method may overstate or understate totals.

Revising Problem Data

The second approach is to make changes in the data recorded in a spreadsheet table. In most cases, "bad" data in a table is a function of mistakes in data entry; but they may also be a function of errors in meter reading, estimated readings, or any number of reasons.

Occupancy, maintenance, and modernization staff can provide valuable insight into apparent patterns (e.g., when vacancies or modernization has occurred). As the reasons for erratic consumption become evident, the decision of whether to use the information "as is," delete it, or modify it can be made with greater confidence. If there are many very similar dwelling units in the allowance category, it is reasonable, and quick, to delete erratic data. In many cases where limited data is available, it may be wiser to make corrections and estimates. In either case, understanding as much as possible about the data will improve a PHA's confidence in its UAs.

Deciding which, if any, data elements are problematic; and then, which data, if any, should be eliminated or revised, and finally what method to use to revise problem data will be based on each PHA's own experiences and data.

- ***Option 1. Review source data and change incorrect data in spreadsheet***

  The PHA staff member responsible for utility allowance data should go back to the original source documents, check the consumption numbers that were

entered in the spreadsheet table, and make the appropriate changes if there has been an error.

- ***Option 2. Substitute averaged data for missing data***

  In some cases, it may be preferable to substitute average consumption for missing data or data that a PHA knows is incorrect, when the correct data cannot be located. The process for making this substitution is as follows:

  - Calculate the average usage, for the month in question, for all dwelling units.
  - Substitute missing or incorrect data with the average for all dwelling units.

Sporadic Readings

Utility meter readings are ideally made at regular intervals, but they are often made sporadically or at irregular intervals. The records from these readings should not be used or should be adjusted to reflect consistent time periods. This adjustment can often be accomplished by dividing the reading by the number of days between readings to get average use per day and multiplying that number by a standard number of days.

Estimated Readings

There are many reasons why a particular meter is not read: bad weather, a busy schedule, a sick meter-reader, or a broken meter. In cases of estimated readings, the PHA may decide to separate the data and then delete this dwelling unit from the data (if the PHA has sufficient good data) or draw a line that mimics normal use patterns. Estimated readings are common and rarely ruin the validity of the analysis. Billing data that were “estimated” can be highlighted on a spreadsheet.

Optional Adjusting for Climate Changes – Heating Only

An alternative to establishing consumption allowances based on a single year database is to establish allowances based on one or more years' worth of consumption data that have been normalized for weather conditions based on 30-year Heating Degree Day (HDD) averages. This approach is only appropriate for utilities used for space heating. **If allowances are based on normalized consumption data, the PHA does not need to obtain new consumption data every year.** This approach may be especially attractive for PHAs that have individually metered utilities.

Normalizing the data requires the following information:

- ***One or more years’ worth of consumption data.*** Data from at least one year (12 consecutive months) are required. If the PHA has not obtained actual consumption data in the last two years, then the PHA should obtain

more recent data. If the PHA has been using a three-year rolling database, then this database may be used as well for this alternative approach. By doing so, the PHA can simplify what needs to be done annually as part of the review of allowances.

- ***Total heating degree-days (HDD).*** This information must be obtained for the year or years from which the consumption data is taken. This information (HDD) may be obtained from the NOAA National Climatic Data Center or an area weather monitoring station. This data should be from the same source as the 30-year average degree-days used in this process (see below).
- ***Thirty-year average annual heating degree-days (HDD).*** The 30-year average annual degree-days should be from the same source as the degree-days for the year in which the consumption data is recorded.
- ***Thirty-year average monthly heating degree-days (HDD).*** Thirty-year average monthly degree-days are required only for check-metered utilities, or for individually metered utilities for which the PHA provides seasonally adjusted allowances.

Once the PHA gathers the Heating Degree Days (HDD) data for the current year and 30-years, the next step is to determine a HDD factor to calculate with the consumption average totals. To accomplish this, the 30-Year Average HDD should be divided by the Total Annual HDD amount.

Example: 30-year Average HDD = 7348 divided by 6386 Current Year Average HDD = **1.15 HDD Factor**

The resulting factor will then be used to calculate a new adjusted consumption average.

Example: Proposed Winter Consumption Average for 0-BR unit: (See chart below)
752 kWhs times 1.15 HDD Factor = **865 Adjusted kWhs**

Table 2-3: Normalizing Data with Heating Degree Day Factor *(for illustration purposes only)*

Check-Metered Electric Consumption Allowances
Actual Consumptions from Study
(Normalized for 30-year average Heating Degree Days Factor: 1.15)

Development	Proposed Consumption Averages					
ABC Elderly Development	0 BR	1 BR	2 BR	3 BR	4 BR	5 BR
Winter Average	**865**	**1268**	**1570**			
Summer Average	381	504	659			

Heating Degree Days Factor
1.15

Note: Bold figures have been adjusted (normalized) for climate changes.

Adjusting the Average Total Consumptions for High Users and Low Users

This step assists the PHA in removing those average consumption totals that are higher or lower than normal usage. After the PHA has entered into the spreadsheet tables all data from the utility records for each allowance category the PHA must calculate the average (or mean) total consumption levels. The first step is to utilize the "sort" function of the spreadsheet and sort the data records from highest usage to lowest usage. The next step is to remove the consumption averages for approximately 10-15 percent of the high users, in order to meet the regulatory requirements of "an estimate of a reasonable amount of utilities consumed by an energy-conservative household", and 5-10 percent of the low users. These percentage amounts are commonly used. The data records that are removed should be documented in another section of the report listing the dwelling unit or addresses and the consumption amounts. The final step is to calculate the average total consumption by adding together the remaining consumption averages and dividing by the number of records that were added together.

This is the final step for PHA's with check-metered utilities which are PHA-paid. Now the PHA should prepare a chart for the **Consumption Allowance Schedule**. This chart should show the monthly consumption allowances separated by housing development (or AMP), bedroom size and all applicable utilities (See example chart below). This consumption allowance schedule will be used as the basis for which the PHA will surcharge residents who exceed these amounts (utilizing the utility rates charged to the PHA by the utility supplier). PHA Boards may adopt a "grace factor" usually between 5% and 10% above this base schedule in order not to penalize energy conservative residents during unusually high usage months beyond their control (e.g., very cold weather). See Chapter 6 for implementation.

Table 2-4: Sample Consumption Allowance Schedule *(for illustration purposes only)*

LOW-RENT MONTHLY CONSUMPTION ALLOWANCE SCHEDULE
for PHA-Furnished Check-Metered Utilities

High Rise - ABC Elderly Development	**0BR**	**1BR**	**2BR**	**3BR**	**4BR**
Electricity (kWhs) Winter (Dec-Mar)	711	872	1083		
Electricity (kWhs) Summer (Apr-Nov)	691	852	1063		
Water (Gallons)	2463	4013	5563		

Semi-Detached – XYZ Family AMP	0BR	1BR	2BR	3BR	4BR
Electricity (kWhs)		231	297	364	
Natural Gas (therms) Winter (Dec-Mar)		35	52	59	
Natural Gas (therms) Summer (Apr-Nov)		15	32	39	
Water (Gallons)		4013	5563	7750	

Check-Meter Consumption Allowances

Utility Allowances Continue

Step 10. Convert Consumption Allowances into Utility Allowances

After the average total consumption is calculated, the final step in determining UAs for resident-paid utilities is to convert the consumption levels calculated in the above steps into a monetary utility cost or dollar allowance. In its simplest form, this means multiplying the average consumption total (e.g. kWh) by the current residential utility rates and charges (in dollars) provided by the utility supplier. (See Chapter 5 for a more detailed discussion of Utility Rates and Calculating UAs.)

Once the PHA has established UAs for each type of dwelling unit (e.g., 1 bedroom gas heated), for a specific building, all residents living in similar dwelling units in that building will receive the same UA.

Estimating the Consumption Requirements for Trash/Garbage

Trash/garbage pickup is generally charged as a flat rate which sometimes includes recycling. This rate should serve as the amount of the trash collection dollar allowance. PHAs should schedule several times during the year when residents may exceed the trash allowance to accommodate greater disposal needs due to certain circumstances, such as residents moving in or out, spring cleaning, and the holidays. PHAs are advised to take measures to ensure that the trash services are used solely by the public housing community.

Utility Allowance Schedule

Finally, the PHA should prepare a **Utility Allowance Schedule** showing the individual monthly UAs for each utility type and the total monthly UA amount (including all applicable utilities) for each bedroom size at each applicable housing development. See example of Utility Allowance Schedule in Chapter 4.

It is important to note here that the HUD regulations 24 CFR 965, Subpart E Resident Allowances for Utilities the PHA is required to retain all support documentation used in the development or updating of UAs.

3 Establishing Utility Allowances Using the Engineering-Based Methodology

CHAPTER 3: Establishing Utility Allowances Using the Engineering-Based Methodology

CHAPTER OVERVIEW: This chapter provides a description of the engineering approach to developing utility allowances so the PHA is aware of what is involved in this process. As this method can be highly technical, it is not necessarily meant to be a "how-to" chapter. To assist the PHA, utility measurement conversion charts have been included at the end of the chapter and a resource website has been provided in the text.

The engineering-based method uses engineering assumptions created from utility consumption benchmarks, weather patterns and modeling. It emphasizes the physical science of utility consumption using building performance, end-use profile behaviors, and performance factors. Detailed information on buildings and their equipment is required. Beginning with utility data gathered from historic studies of buildings with similar construction types, thermal or equipment efficiencies, and in varying geographical or climatic locations, software modeling tools are created which simulate the buildings consumption patterns over a period of time. The increased knowledge specificity, and accuracy required in an engineering-based method can result in what appears to be a time-consuming and more complicated process. While untrained (or minimally trained) PHA staff could use engineering tools to calculate utility allowances (UAs), third-parties such as engineers, certified energy raters, energy managers, energy auditors, and energy service companies (ESCOs), energy service providers (ESP), and home energy rating system (HERS) providers are generally contracted to conduct these calculations and studies.

The actual/historical consumption-based method and the engineering-based method ideally should rely on each other to ensure accuracy and precision. By comparing the average engineered consumption to actual/historical consumption data, the PHA will be able to make a better judgment about whether a range above the average is appropriate in setting the standard for an energy-conservative household, and how large that range should be. Engineering-based allowances should include utility bill comparisons as a means of crossing-checking the resulting consumptions and to insure reasonable allowance levels.

Various Utility Estimates

Base Loads

Base load is the term given to the sum of all allowable utility consumptions. The space heating and air conditioning consumptions vary significantly with the seasons. Other uses vary based on the number of occupants and their lifestyle. Because lifestyle patterns of families with a similar number of occupants are usually the same over several months of time, the consumptions are fairly uniform. Princeton University used this knowledge as the core in developing its' PRISM® normalization software. The premise of individuals being very consistent in their daily and seasonal usage patterns allows for a relatively accurate assumption to be made of the building. Consumption for each of these can be estimated if the equipment's estimated time in use and fuel efficiency characteristics is known.

Space Heating Estimates

In Public Housing, space heating is generally provided by electricity, natural gas, propane or fuel oil. Electricity and natural gas are the most common. The space heating requirements of a dwelling unit depend on various factors including dwelling unit size, arrangement within the building, the design/construction of the housing development, the physical condition (maintenance) of the housing development, the local climate, the energy efficiency of the heating system, and the indoor temperature set points.

Heat loss is the rate of heat transfer, per hour from an occupied space to the outdoors. Loss occurs through walls, ceilings, floors, windows and doors of a structure.

Methods for calculating heat loss are available from engineering texts and societies, including the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE). They include the following:

- Heating degree day methods
- Monthly temperature Bin methods
- Hourly temperature models

There are numerous software programs that use these methods, most commonly used is the DOE-2 simulation engine created by Lawrence Berkley Laboratories for the United States Department of Energy (DOE). Other tools include REM/Rate, Energy Gauge (both require user licensing), and the web-based Home Energy Saver created jointly by the Environmental Protection Agency (EPA) and DOE. These tools use

information about the physical condition and design of buildings to estimate performance. These require information such as infiltration (air leakage), duct leakage, and equipment efficiencies, which are not usually known precisely for individual buildings without performance testing. As a result, the engineering estimates should be compared to actual utility data in order to adjust for discretionary variables. In some cases, professional consultation may be required.

Once the PHA has selected a tool and has gathered the other necessary information, it can calculate the annual energy requirement for space heating.

Monthly requirements should not be determined by simply dividing the annual consumption requirement by 12 months. Many utilities rates vary seasonally (e.g., winter versus summer). Energy requirements for space heating, for example, are concentrated in the winter months and are generally non-existent in the summer months. To compute the appropriate consumption for each month, add the heating load to the base load consumption to each month, and then compute the UA for each month of the year. The average of these monthly estimated costs is used in the process of setting a uniform monthly UA.

Air Conditioning Estimates

Air conditioning (A/C) can be determined from actual isolated or metered consumption data or through engineering estimates when actual consumption data is unknown. Air conditioning is made available through window units and central systems. The monthly consumption of electricity required for air conditioning depends on outside temperature, window orientation (west versus north facing), shading type (multi-pan/low emissive), and A/C equipment configuration and efficiency.

Using actual data, the PHA would determine electricity consumption for summer months and compare that consumption to the base load period. For households not heated electrically, the base load period would be winter months. For households using electric heating, the base load period would be the swing months between winter and summer.

Air conditioning calculations are largely dependent on solar incidence and building orientation. These calculations are automated in many commercial off-the-shelf software programs. To get the best results, software should use monthly Bin or hourly simulation techniques. For window air conditioners, an approximation can sometimes be made. Window units only cool a portion of the dwelling and often do not have temperature controls. As a result they run until the occupant turns them off. A

simplification can be made by assuming hours of use per day and the power draw (wattage) for a typical window unit, usually found on a nameplate located on the unit itself. The PHA should conduct a survey of air conditioners in use and determine the nameplate efficiency and power draw or make an estimate of the power used. The total allowance is the hours of use multiplied by the power draw (wattage) of the equipment.

It is beneficial to keep in mind that air conditioning consumption varies with climate, equipment, building design, and specialty consumption requirements (e.g., medical condition or elderly). Accurate air conditioning consumptions cannot be calculated without knowing site-specific information.

Domestic Hot Water Heating Estimates

Domestic hot water can be heated using electricity, natural gas, propane, fuel oil, or solar energy. The monthly energy requirement for domestic hot water heating is the energy required to heat a volume of water to a specified discharge or tank temperature (usually 130°F). The energy use required to heat the water depends on the fuel type, inlet water temperature, amount of water consumed, and the efficiency (energy factor/EF) of the hot water system. The system efficiency depends on whether the equipment is a direct tank-type, indirect tank storage water heater, or a direct fired tank-less water heater.

The temperature rise is the difference between the cold-water inlet temperature and the hot water outlet temperature. The cold-water temperature depends on the geographical location; it tends to vary seasonally, which can be between 35°F and 99°F. The hot water temperature at the tap may range from 100°F to 140°F. The suggested temperature for hot water at the tap is 120°F. Most water utility suppliers can provide the average temperature of the water in their service area or can be measured at a faucet nearest the water system entry point to the home.

The number of gallons of hot water per-unit per-month depends on the number of people per dwelling unit and if the dwelling unit has water-saving devices such as low-flow showerheads (2.0 GPM or less) or faucet aerators (.50 GPM). In addition, the presence of certain water-using appliances (e.g., dish washers, clothes washing machines, etc.) can drastically affect hot water requirements. On average, a person requires roughly 20 gallons of hot water per day (e.g., 140 gallons per week); actual hot water consumption may vary widely depending on the age and lifestyle of the residents. If the dwelling units are not equipped with water-saving devices, or there are hot water leaks in some of the dwelling units, hot water requirements may be higher.

The efficiency of the hot water heating system depends on the fuel type, and on the age, maintenance, and type of the system. Electric water heaters with storage tanks can have an efficiency of up to 97%, and the efficiency of gas water heaters with storage tanks can be in the range of 50 to 65%. Newer water heaters tend to have higher efficiency ratings due to increased levels of tank insulation. Where the water heating system has a lengthy distribution system or a separate storage tank, the system efficiency is lower than that of the water heater itself because of storage and distribution heat losses and increased water usage (e.g., clearing line of cold water). This can be reduced by insulating exposed lines. Water at the tap is cooler than water at the hot water heater. In such cases, a qualified individual should estimate the efficiency of the system.

The temperature of the water and fuel type is inserted into the formula resulting in the required amount of Btus (British thermal units) in order to maintain water temperature. The Btus are then converted into other units of measure, such as therms for gas, kWh for electricity, and hundred cubic feet (ccf) for water.

Estimating the Energy Consumption Requirements for Laundry

Where clothes washer and/or clothes dryer hook-ups are provided by the PHA, an allowance may be provided for the energy used by those appliances. The electricity consumption requirement of a clothes washer depends on the wattage of the clothes washer, the number of loads per dwelling unit per month, and the length of an average wash cycle. The energy (gas or electricity) consumption requirements of a clothes dryer depends on the wattage or gas consumption of the dryer, the number of loads per dwelling unit per month, and the length of an average drying time. Manufacturer data and performance estimates are available on the world-wide web and in the information provided in the owners manuals for laundry equipment. These figures can be adjusted to reflect actual conditions, or more importantly, when a PHA has to seek redress when laundry equipment fails to perform at a manufacturer's specifications and/or standards of performance.

If laundry is deemed an allowable end-use, 140 gallons per person per week may not be sufficient to cover hot water consumption. A conventional washer uses about 25-35 gallons per load. If a household washes one load of hot-water laundry (or two loads of warm-water laundry) per-person per-week, then the hot water requirement increases to 165 gallons at a minimum per-person per-week (140+25=165)). Using hot-water cycles for laundry, uses about twice as much hot water as warm-water cycles, especially for the rinse cycle. If a household washes one load of warm-water laundry per-person per-

week, then the hot water requirement increases to 155 gallons per-person per-week (140 + 15 = 155). If a household washes two loads of warm-water laundry per-person per-week, then the hot water requirement increases to 170 gallons per-person per-week (140 + 15+ 15 = 170), etc.

Estimating the Consumption Requirements without Water

Miscellaneous base load uses include cooking, lighting, refrigeration, and *plug loads* (all electrical use except space heat, air conditioning, and water heating). Refrigeration and cooking are sometimes added to this list of exclusions using actual data, these loads are generally consistent month-to-month.

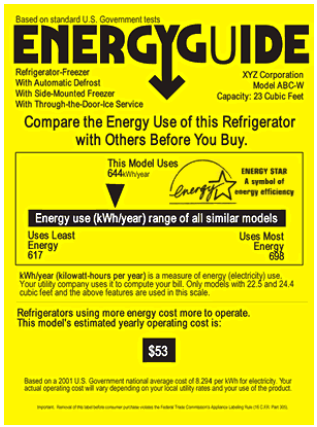
Cooking and Lighting

Cooking and lighting requirements depend on household size and are captured when data are segmented by bedroom.

Refrigerators

Refrigerators are used year-round and are dependent on their size. Most PHAs use a consistent refrigerator size for all dwelling units regardless of bedrooms, except that five- or six-bedroom households may receive larger models.

If engineering estimates are required, the loads are considered separately. Refrigerator use depends on equipment age and condition (maintenance). The consumption can be obtained from manufacturer data for the equipment as provided on the yellow Energy Guide (see example below). These can be downloaded from the manufactures website in most cases.


Based on standard U.S. Government tests

ENERGYGUIDE

Refrigerator-Freezer
With Automatic Defrost
With Side-Mounted Freezer
With Through-the-Door-Ice Service

XYZ Corporation
Model ABC-W
Capacity: 23 Cubic Feet

Compare the Energy Use of this Refrigerator with Others Before You Buy.

This Model Uses 644kWh/year

ENERGY STAR
A symbol of energy efficiency

Energy use (kWh/year) range of all similar models

Uses Least Energy 617

Uses Most Energy 698

kWh/year (kilowatt-hours per year) is a measure of energy (electricity) use. Your utility company uses it to compute your bill. Only models with 22.5 and 24.4 cubic feet and the above features are used in this scale.

Refrigerators using more energy cost more to operate.
This model's estimated yearly operating cost is:

$53

Based on a 2001 U.S. Government national average cost of 8.2¢/¢ per kWh for electricity. Your actual operating cost will vary depending on your local utility rates and your use of the product.

Cooking and plug load estimates are available through the U.S. Department of Energy's Residential Energy Consumption Survey 2001 (RECS) these are available at http://www.eia.doe.gov/emeu/recs/recs2001/publicuse2001.html. Estimating the hours

of use for each fixture location and multiplying the use by the fixture wattage determines lighting consumption. A 60-watt incandescent lamp, for example, uses 60 watts; a 2-lamp, 4-foot, T12 linear fluorescent fixture uses the combined wattage of its lamps and ballasts, or 96 watts.

Water

The level of water consumption that is reasonable depends on the number of occupants in a dwelling unit and on whether the dwelling unit has low-volume toilets (1.5 gallons per flush or less), faucet aerators (.5 gallons per minute (GPM) or less), and low-flow showerheads (2.0 gallons per minute (GPM) or less). For dwelling units where these water-saving measures have been installed, 20 gallons per-person per-day can generally be considered a reasonable amount. (This amount is consistent with literature from several utilities. The 20 gallons includes water used for laundry.) If water-saving measures are not in place, the allowable amount should be higher. The per-person per-day amount should be multiplied by the number of legal occupants in the dwelling unit and by 31 days to get a per-unit per-month figure. As an example, four occupants x per-person amount x 31 days would equal per-unit per-month. Outdoor watering by residents will need to taken into account as this will result in increased consumption.

Water utility suppliers typically charge for usage per hundred cubic feet (ccf) or per thousand gallons. The PHA may need to convert the consumption amount estimated in this step from thousand gallons to ccf (or visa versa) before calculating the UAs. (See the following conversion tables)

Conversion Charts

Water Conversion Table 3.1				
1 gallon of water	=	8.34 lbs	=	0.134 cubic feet
1 cubic foot (CF)	=	7.48 gallons	=	62.4 lbs of water
100 Cubic feet (CCF)	=	748 gallons	=	46,675.2 lbs of water
1 cubic foot per second (CFS)	=	7.48 gallons	=	448.800 gallons per minute (gpm)
1 cfs for 24 hrs	=	646,317 gallons		
1 cfs for 30 days	=	235,889,280 gallons		
1 million gallons	=	133,689.8 cubic feet		

Fuel Energy Content & Conversion Table 3.2

1 Therm any Fuel = 100,000 BTU

The exact values will vary depending on the quality of the fuel and in some cases the pressure.

Electricity	1 kWH electricity = 3,413 BTU
Natural Gas	1 cubic foot = 1,050 BTU
Propane	1 gallon = 91,500 BTU
	1 cubic foot = 2,500 BTU
	1 pound = 21,500 BTU
	4.24 lbs = 1 gallon
	36.39 cubic feet = 1 gallon
Fuel Oils	1 gallon kerosene = 135,000 BTU
	1 gallon #2 oil = 138,500 BTU
Other Fuels (dry)	1 lb wood = 7,870 BTU
	1 lb coal (subituminous) = 8,800 BTU
	1 lb coal (bituminous) = 11,500 BTU
	1 lb coal (anthracite) = 12,700 BTU

KBtu Conversion Table 3.3

The below table provides the multiplier to convert a unit of measure **to kBtu:**

1. Locate the energy source and the applicable unit of measure.
2. Select the conversion multiplier from the right column.
3. Multiply non-kBtu units of energy by multiplier and this converts the energy unit to kBtu equivalent.

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Energy Source	Unit of Measure	Multiplier
Electricity	kWh (thousand Watt-hours)	3.412
	MWh (million Watt-hours)	3412
	MBtu (million Btu)	1000
Natural Gas	MBtu (million Btu)	1000
	ccf (hundred cubic feet)	100
	therms	100
	kcf (thousand cubic feet)	1123.9
	cf (cubic feet)	1.1239
	MCF (million cubic feet)	1123900
Propane	MBtu (million Btu)	1000
	kcf (thousand cubic feet)	1000.06
	Gallons	90.0054
	cf (cubic feet)	1.0336235
Fuel Oil (No. 1)	kBtu/Sq. Ft.	1
	MBtu (million Btu)	1000

Fuel Oil (No. 2)		Gallons MBtu (million Btu) Gallons		134.9999811 1000 139.99998

Report

Insert results of engineering method study into similar schedules and charts illustrated in Chapters 2 and 4. Maintain documentation on rationale, software, assumptions, rates and charges, building characteristics, adjustments and other data utilized in developing total consumptions and UAs (explained in detail in subsequent chapters).

Energy Efficient Utility Allowances

An increasing number of PHAs are developing Energy Efficient Utility Allowances for housing developments that meet above energy code standards (e.g., ENERGY STAR® labeled homes). Many tax credit and mixed finance developments are being built to these above code specifications. Developers for tax credit properties and mixed finance developments are increasingly using PHA-approved Section 8 Energy Efficient Utility Allowance schedules to do financial projections and feasibilities of development. This also gives the PHA an opportunity to develop an Energy Efficient Public Housing Utility Allowance schedule for these above code built or retrofitted dwelling units.

The Energy Efficient Utility Allowances should be determined by utilizing ENERGY STAR® Home Rating standards. This will require the PHA to contract with an accredited ENERGY STAR® provider or rater to conduct a Home Energy Rating including performance testing. The rating will determine if the dwelling units meet the above code standards and will also provide support data, engineering calculations, utility usage and an annual utility cost which the PHA may convert to monthly Energy Efficient Utility Allowances. We encourage PHAs who have incorporated above code modernization or new construction programs to have dwelling units rated in order to provide Energy Efficient Utility Allowances.

4 Calculating Utility Allowances

CHAPTER 4: Calculating Utility Allowances

CHAPTER OVERVIEW: Now that the consumptions are calculated using either of the methods in Chapter 2 or Chapter 3, this chapter provides instruction to apply utility rates and charges to the average consumption data, to develop the actual Utility Allowance Schedule. *PHAs performing the Annual Utility Allowance (UA) Update and not a new UA Consumption Study, can by-pass the steps in Chapters 2 and 3, and start at this chapter.*

Utility Rates and Charges

A multitude of utility and supply rate systems exist across the country. Rates can vary by season (e.g., summer, winter), fuel type (e.g., natural gas, electricity), location (e.g., city, county), tariff, and meter type/size. Utility suppliers and their respective rate structures are major factors in the development of utility allowances (UAs). The UA schedules established by PHAs are based on existing residential rates and charges billed to the residents. The utility rate calculation includes fixed and volumetric charges. If there are state taxes these would be part of the calculation. For surcharge calculations for PHA-provided utilities, most PHAs are exempt from state taxes. Allowance calculations require the use of a variety of utility rates and charges, and establishing and implementing the correct rates.

Deregulation of Utilities

In many states the electric and natural gas suppliers are deregulated causing PHAs to deal with multiple utility suppliers. Additionally, larger states such as Texas, California, Arizona, and Illinois have a large number of PHAs with jurisdictions covering multiple cities/towns, counties, metropolitan areas, and regional areas. This often results in multiple utility suppliers servicing a jurisdiction. Dealing with multiple utility suppliers can be difficult. They often have their own privacy rules and methods of calculating costs.

Currently, HUD regulations do not address deregulated utilities. PHAs who have this dilemma with multiple electric and/or natural gas suppliers are dealing with this issue by utilizing one of the following methods:

- Utilize the rates from a local utility supplier with the best (consistently lowest) rates;
- Utilize the rates from a local utility supplier with the higher rates;

- Utilize the utility supplier which the majority of their residents are customers;
- Utilize the rates from two or three utility suppliers, calculate the utility costs, then average the costs together for one amount;
- Calculate separate utility costs for each local utility supplier.

A PHA should choose the method that best fits their situation and that provides a satisfactory confidence level. Additionally, a PHA should check with neighboring PHAs to see which method they are currently utilizing.

Metering Systems

The utility industry computes rates by utilizing one of three accepted metering systems. They are:

- **Master-meter**: A master-meter is a single meter that records consumption for an entire building and the PHA pays the utility costs to the utility supplier. Residents living in buildings with a single master-meter do not receive UAs and are not surcharged for over usage.
- **Check-meter**: Some PHAs install separate sub-meters (commonly called check-meters) in addition to the master-meter to measure consumption by individual dwelling units. As with master-metered utilities, the PHA pays the utility cost directly to the utility supplier. With check-metered utilities the PHA provides each residential dwelling unit a reasonable ***consumption allowance*** that it may consume. When the reasonable level of consumption is exceeded, the resident is charged a surcharge based on the PHAs billing rates.
- **Individual meter**: Each residential dwelling unit has its own individual meter. Residents living in these dwelling units have separate accounts with the utility supplier, are sent bills from the utility supplier, and pay their utility bills directly to the utility supplier. The PHA provides a ***utility allowance*** to residents that have individual meters and this amount is usually subtracted from their rent or the total tenant payment.

Rate Structures

The PHA's UAs are developed using the current basic residential rates billed to the residents. If a utility supplier's new rate is only under review or proposed, this rate should not be used to calculate UAs. If the rate is approved but not implemented, the transition date should be noted, and UAs computed for both the current rate and the future rate. In the case of surcharges, the cost of the utility is computed by the utility rate charged to the PHA. The PHA's utility billing rates are usually not the same

residential rates charged to the residents. The PHA may be charged a commercial rate or special rate. There are several rate types that go along with the metering and supply of utilities.

- ***Service Flat Fee/Charge (fixed)****:* Fixed monthly service charges are not based on consumption usage. Some utility suppliers have a per day fixed charge (multiply per day rate by 31 days to get monthly charge). Example labels for this type of fee/charge are: *Customer Charge, Basic Service Charge, Facilities Charge, Monthly Minimum Charge, Ready-to-Serve, etc.*
- ***Monthly Fee/Charge (fixed):*** This is a fixed monthly service charge that is not based on consumption usage. A monthly fixed charge is a standard for some utility types such as trash or garbage collection. Some water and sewer suppliers charge only a monthly charge not based on usage. These costs are added directly into the dollar utility allowance. Additional example labels for these monthly charges are: *Drainage Charge, Fire Fee, Extermination Fee, Recycling Fee, etc.*
- ***Monthly Minimum Charge:*** This is a fixed monthly minimum charge that includes consumption usage and serves as the first level/tier of the consumption range. Example labels for this type charge are: *Monthly Minimum Charge, Minimum Service Charge, Minimum Monthly Rate/Charge, etc.*
- ***Base Energy Rate (per usage):*** These are rates based on consumption usage and are the most common system for metered utilities. Some utility suppliers have multi-levels with different rates and/or different consumption ranges per level. Utility suppliers may also have different base rates for winter and summer seasons. Example labels for this type of rate are: *Energy Charge, Commodity Charge, Residential Rate, Base Rate, Delivery Charge, Supply Charge, Baseline Quantities, Excess of Baseline, Transmission Rate, Distribution Rate, etc.*
- ***Cost of Fuel Charge (per usage):*** This rate is a pass-on rate factor based on the utility supplier's cost of fuel. This rate can vary monthly, quarterly or yearly. Since this factor can vary greatly during a 12-month period due to the cost of fuel, it is best to obtain a history of the factor for the most recent 6-12 months and calculate an average. Example labels for this type of rate are: *Cost of Gas, Gas Cost Adjustment (GCA), Gas Cost Factor, Purchased Gas Cost Adjustment, Purchased Gas Adjustment (PGA), Purchased Gas Cost Recovery (PGCR), Fuel Factor, etc.*
- ***Fees and Surcharges*****:** Many utility suppliers now charge additional fees and surcharges that change from time to time. The fee or surcharge may be

calculated by consumption usage or for a percentage of the total cost. These charges may also have a maximum cost. Example labels for surcharges based on consumption are: *Franchise Fee/Charge, Generation Service Fee/Charge, Renewable Energy Charge, Competitive Transition Assessment, Securitization Bond/Tax, Nuclear Decommissioning Charge, State Gross Receipts Tax, Environmental Surcharge, etc.* Example labels for surcharges based on percentage of cost are: *Franchise Tax, Generation Tax; State Regulatory Tax, Gross Receipts Tax, State Tax Adjustment, Utility Tax, Revenue Tax, etc.*

- ***Bulk purchased utilities:*** This involves large quantities of fuel delivered with long intervals between deliveries. They are typically delivered and stored at the dwelling unit. Fuel oil, coal, and cordwood are examples. Bulk purchased utilities have a unit cost just as metered utilities do. They have similarities to all of the metering methods. Since these rates can vary greatly during a 12-month period due to the cost of fuel, it is best to obtain a history of the factor for the most recent 6-12 months and calculate an average rate.
- ***Taxes (% of cost):*** Taxes may apply to any of the above rates or charges. This is a factor calculated on the total monthly cost or a percentage of the cost: Example labels are: *City Tax, County Tax, State Tax, Municipal Utility Tax, Public Utility Tax, Excise Tax, State Occupancy Tax, Legislation Reduction, Base Rate Reduction, Municipal Charge, etc.*

The PHA should prepare a separate document listing the each applicable utility company's name, phone number and current utility rates and charges that will be used in the calculating of UAs.

There are generally three billing methods used by utility suppliers:

- Monthly
- Bi-Monthly
- Quarterly

Keep in mind that UAs are provided on a monthly basis, therefore if the utility supplier has bi-monthly or quarterly fixed charges, these charges will need to be converted to monthly charges.

Verify Calculations with Sample Utility Bills

Because of the details of many utility supplier's rate formulas or rate systems (how they calculate costs) and possibly unfamiliar language used in the utility industry, sample

computations based on actual residential bills should be used to ensure the correct mathematical formula is being used. Additionally, the sample utility bill can be used to verify that all applicable rates and charges have been included in the cost calculation. These sample utility bills serve as a great quality control (QC) tool.

Calculating Utility Allowances

Totaling Component Consumption Amounts for Each Utility

Once the monthly consumption requirements of various end-uses (e.g. space heating, hot water heating, cooking, lighting) have been determined for each allowance category, the next step is to establish a total consumption allowance for each utility (e.g. gas and electricity) within each allowance category. This is done by adding together the end-use consumption amounts for that utility. For example, if space heating, hot water heating and cooking are all fueled by natural gas, then the consumption amounts for space heating, hot water heating and cooking should be added together to obtain a total natural gas consumption allowance. For PHA-provided utilities these consumption totals become the Consumption Allowances which are the basis for which the PHA will surcharge residents for excess usage.

Next the total monthly consumption allowances should converted into a dollar amount or utility allowance.

Electricity. Consumption amounts of electricity are measured in kilowatt hours (kWhs). The kWh amounts are converted to dollar amounts by multiplying the consumption totals with the residential utility rates and charges levied by the electric utility supplier. Some electric utility suppliers charge one rate for consumption up to a certain level and another rate for consumption beyond this level (tiered rate structure). If the electric utility supplier has seasonal rates, the PHA should multiply the seasonal consumption amounts by the appropriate seasonal rate. For example, if the utility has one rate for September through May, and another rate for June through August, then the consumption amounts in June, July, and August should be multiplied by the summer rate, and the consumption amounts in the other months should be multiplied by the off-season rate. Additionally, fixed fees and other fees should be prorated on a monthly basis and added to the allowance.

Natural Gas. Consumption amounts for natural gas are usually measured in therms, cubic feet (cf), hundred cubic feet (ccf) or thousand cubic feet (mcf). The consumption totals for natural gas are converted to dollar amounts by multiplying them by the rate per therm, cf, ccf, or mcf and adding any other charges levied by the utility supplier. As with

electricity, if the natural gas supplier has seasonal rates, these rates should be used accordingly. *Note: 1 therm is equal to 1 ccf or 100 cf or .1 mcf*. Be sure your consumption totals used the same unit measurements (e.g., therms, ccf, etc.) as the rate measurement (e.g., therms, ccf, etc.)

Propane or Fuel Oil. Consumption amounts for propane and fuel oil are measured in gallons. The rate per gallon of propane or fuel oil varies from day-to-day based on the cost of fuel at that time. Therefore, since the UAs will be in effect for at least one year, it is best to utilize an average rate from the utility supplier. The consumption totals for propane or fuel oil are converted to dollar amounts by multiplying the consumption totals by the average price per gallon of propane or fuel oil.

Water. Consumption amounts for water are usually measured in ccf or 1000 gallons. The consumption amounts for water are converted to dollar amounts by multiplying them by the rate per ccf or 1000 gallons. Where water is individually metered and a monthly flat fee is charged, this amount should be added to the total dollar utility allowance.

Sewer/Wastewater. In most areas, there is an additional charge for sewer service and/or this service is provided by a different company than the water supplier. In some cases the sewer charge is a flat monthly charge not dependent on water usage. Like water service, consumption amounts for sewer are usually measured in ccf or 1000 gallons. If the sewer company charges a usage rate, then this charge should be multiplied by the ccf or 1000 gallons of water used. In some cases the sewer cost is multiplied by a percentage of the water used or on the average water used in the winter months (December, January and February).

Individually Metered Utilities: Establishing Equal Monthly Allowances

PHAs with individually metered utilities generally provide equal monthly UAs to their residents. The monthly UAs calculated for each allowance category should be added together to obtain a total monthly utility allowance for each bedroom size at each applicable housing development. Many PHAs round UAs up to nearest dollar to simplify rent calculations.

If the utility supplier does not offer residents a uniform payment plan, the PHA may provide for seasonal variations in its UAs.

Complete Utility Allowance Schedule

Totaling All Resident-Paid Utility Allowances by Housing Dwelling Unit

Under 24 CFR 965.503, separate allowances shall be established for each utility and for each category of dwelling units determined by the PHA.

The PHA should also prepare a **Utility Allowance Schedule** to publish (post) and communicate with the residents and Board of Commissioners (see Appendix B6: Sample Board Resolution). The Utility Allowance Schedule is public information and should be made available to anyone who requests a copy of it. The size of the schedule is dependent upon the number of housing developments, number of bedroom sizes, and utilities paid by residents. See Sample below.

For the purposes of Asset Management Projects (AMPs), the PHA may combine or group the UAs by AMPs.

Table 4-1: Sample Utility Allowance Schedule *(for illustration purposes only)*

UTILITY ALLOWANCE SCHEDULE

Building Type: High Rise

ABC Elderly Development	0BR	1BR	2BR	3BR	4BR
Electricity	$44.00	$51.00	$59.00		
Water	$19.00	$22.00	$24.00		
Sewer	$40.00	$47.00	$49.00		
Totals	**$103.00**	**$120.00**	**$132.00**		

Building Type: Semi-Detached/Duplex

Anytown Family AMP	0BR	1BR	2BR	3BR	4BR
Electricity		$37.00	$42.00	$45.00	
Natural Gas		$56.00	$65.00	$72.00	
Water		$22.00	$24.00	$26.00	
Sewer		$47.00	$49.00	$51.00	
Totals		**$162.00**	**$180.00**	**$194.00**	

Note: These utility allowances are rounded up to nearest dollar.

5 Annual Review of Allowances

CHAPTER 5: – Annual Review of Allowances

CHAPTER OVERVIEW: This chapter is used if, after reading Chapter 1, the PHA decided that an annual review and/or update of its utility allowances is needed rather than a new consumption study. This UA review may result in a new Utility Allowance Schedule. An explanation is provided concerning comparing the current utility rates and charges with the ones used to establish the current Utility Allowances.

Federal regulations 24 CFR 965.507 require that PHAs review their utility allowances (UAs) on an annual basis to ensure that their UAs and surcharges for excess usage are: (1) reasonable and (2) in regulatory compliance. The extent of the review process is driven almost entirely by the methodology that was initially used to calculate the allowances and should always include an examination of changes in utility rates. When utility rates and charges change by 10 percent or more (increase or decrease), the PHA must revise its allowances accordingly.

UAs that were established based on consumption data or engineering calculations should also include an annual review of any major changes to the buildings, equipment, and appliances that would impact UA consumption requirements (e.g., modernization efforts and/or other energy conservation measures implemented by the PHA). Those UAs that were calculated using a single year non-normalized consumption data should include an annual recalculation of the utility allowance changing the data as appropriate from year-to-year. There are two changes that can impact this particular regulatory requirement and therefore require annual assessment:

- Changes in utility rates and charges;
- Changes in the consumption usage of a household (e.g., energy improvements).

As stated above, the annual review process is driven almost entirely by the methodology used to calculate UAs and surcharges. PHAs that utilize the engineering-based method (see Chapter 3, for the Engineering-based Method) for establishing allowances must have available detailed information regarding each building and housing development. They must also have the capacity to utilize engineering calculations and benchmarks. PHAs using the engineering-based method must be aware of gradual changes in buildings, not just major changes. Examples of gradual changes include the settling of insulation, a possible decline in the efficiency of

equipment, additional resident-owned appliances, and any shift in resident consumption patterns driven by societal or other concerns.

PHAs that elect to utilize single year non-normalized data in their consumption-based method must have an annual process of recalculating the allowances after collecting new data for the year in which the utility allowance is being established.

In summary, there are three issues that should be taken into consideration when conducting the annual review of UAs and surcharges:

- **Significant Change:** Review any significant changes to buildings, equipment, or appliances that would affect the consumption requirements of the utility for which the allowance is provided since the time when the allowances were last calculated. Examples of such changes include modernization or weatherization, the installation of space heating or hot water heating systems, the replacement of a large portion of the refrigerators in a housing development. If there have been any significant changes that would affect the consumption requirements of dwelling units then the allowance consumption amounts for the affected dwelling units should be recalculated.
- **Time Period:** Check to see when the last time the consumption allowance amounts were calculated. If these consumptions have not been recalculated in the last five years it is highly recommended (as a best practice) that the consumptions be recalculated to take into account any changes over time that have affected the consumption usage of the dwelling units.
- **Change in Utility Rates and Charges:** Contact the local utility suppliers to gather current rates and charges. Perform a comparison of the new/current utility rates and charges and the rates and charges used to calculate the current UAs. If the rates have changed by ten percent or more (increase or decrease) compared to the ones used when the current UAs were calculated, then the regulations require the PHA to recalculate the UAs based on the new/current rates and charges.

Whenever a consumption allowance adjustment is needed, the PHA can recalculate the average base consumptions by utilizing the original method of calculation. Additionally, if a utility allowance adjustment is needed due to the ten percent change in rates, the PHA should use the new rates and charges recently gathered from utility suppliers to recalculate allowances.

Changes in utility rates due to passed-through costs (such as a fuel adjustment charge/rate, purchased gas adjustment charge/rate, or gas recovery charge/rate) by utility suppliers are considered a rate change as mentioned above. These type of rate changes are not subject to the 60-day notice requirement [24 CFR 965.507(b)]

6 Implementation of Consumption Allowances and Utility Allowances

CHAPTER 6: Implementation of Consumption Allowances and Utility Allowances

CHAPTER OVERVIEW: This chapter provides guidance in the implementation process of the new Consumption Allowances or Utility Allowances Schedules.

The amount that a PHA determines necessary to cover the resident's reasonable utility costs is the utility allowance (UA). It is intended to enable participating families to pay typical costs for utilities and services for households occupying dwelling units of similar size and type in the same locality.

Both the Consumption Allowance Schedule and Utility Allowance Schedule must include the utilities and services necessary to provide housing that is in compliance with Uniform Physical Conditions Standards (UPCS). PHAs are required to implement and maintain a reasonable consumption allowance schedule for PHA-provided utilities and a utility allowance schedule for resident-paid utilities and other resident-paid housing services such as trash collection.

Support Documentation

The PHA must maintain a record of all support documents detailing the basis upon which consumption and utility allowances (UAs) were established. [24 CFR 965.502(b)] Such documents may include, but not be limited to:

- complete documentation supporting the method used for determining average consumptions;
- the utility rates and charges used to calculate the allowances;
- the actual calculations of the allowances;
- software utilized;
- assumptions made;
- building characteristics,;
- adjustments made;
- data utilized in developing total consumptions and UAs;
- plus any other documents used in the study.

Notice to Residents

The PHA must notify all residents of proposed allowances, scheduled surcharges, or revisions to allowances at least 60 days prior to the date the allowances are to become effective [24 CFR 965.502(c)].

The notice to residents must include the following:

- A description of the basis on which the allowances and surcharges have been established or revised, including specification of which equipment and functions are included in the allowance;
- Information on the availability of individual relief;
- Disclosure of where residents can review the documentation that explains how the allowances and surcharges have been calculated;
- Notification to the residents of their right to submit written comments regarding the allowances and surcharges. The period for submitting written comments must extend at least 30 days before the allowances or surcharges become effective [24 CFR 965.502(c)].

Additionally, PHAs should contact local utility providers or conduct research to determine if lower rates are available to their residents. Some electric and/or natural gas utility suppliers offer special lower rates for low-income families. Although not required by HUD regulations, the notice may include information regarding the availability of such special low-income rates or life-line rates. An example of life-line rates are special water and sewage conservation rate structures as provided in part by the U. S. Department of Environmental Protection Agency Notice EPA 816-R-98-002, 1998.

The PHA should review the resident's comments, received during the 30-day comment period) and answer or address any questions that the residents' present. The PHA is not required to change allowances due to residents' complaints, but this comment period allows the PHA another opportunity to review its determinations.

The PHA should post (display) a copy of the new Utility Allowance Schedule(s) and/or Schedule of Surcharges in the PHA's main office. Notification to residents shall be given in the manner provided in the lease or homebuyer agreement. Examples are posting a notice at each housing development/site were resident's live, delivering or mailing a notice to each resident's dwelling unit, or a written announcement in a monthly residential newsletter.

Changes in utility rates due to passed-through costs (such as a fuel adjustment charge/rate, purchased gas adjustment charge/rate, or gas recovery charge/rate) by utility suppliers are not subject to the 60-day notice requirement [24 CFR 965.507(b)]

Individual Relief

In some cases, PHAs may allow individual relief from resident utility bills that have exceeded the PHA's UA. HUD regulations [24 CFR 965.508] specifically permit PHAs to grant individual relief on reasonable grounds when the resident's utility consumption exceeds the PHAs' UA because of the special needs of the elderly, ill or disabled residents, or special factors affecting utility consumption beyond the resident's control.

When granting individual relief, the regulations require that the PHA have a written policy in its Annual Plan/Agency policies that spells out the criteria under which this relief would be granted. The plan/policy should include a PHA contact name and number and the PHA's criteria for granting such relief and how the PHA advises residents to request individual relief.

PHAs should consider the following as valid criteria for granting individual relief:

- The resident's consumption was mistakenly portrayed as excessive due to defects in the meter or errors in the meter reading.
- The resident's over consumption is caused by a characteristic of the dwelling unit or PHA-supplied equipment that is beyond the resident's control such as an energy-deficient refrigerator or inadequate insulation. The UA under these circumstances would have to be adjusted to reflect the higher consumption associated with the dwelling unit until the situation is remedied.
- The resident's over consumption is due to special needs of a resident household member and is not within a resident's ability to control. Special needs might include having as part of the household elderly, ill or disabled residents that have special needs requiring higher energy or water consumption. The allowance should be adjusted to reflect the higher consumption needs associated with the household's special circumstances.

Individual relief should only be granted when excessive consumption is beyond the resident's control. Should the resident's consumption be excessive and within the ability of the resident to control, then no individual relief would be granted. The PHA must provide residents notice on the proposed UAs and scheduled surcharges, and the notice should include the availability of individual relief, the procedures for seeking that

relief, and the PHA's criteria for granting such relief. (See Appendix B for Sample Individual Relief Request form.)

Adopting Utility Allowances

Although not required by HUD regulations, the proposed Consumption Allowances and/or Utility Allowances should be presented to the PHA's Board of Commissioners for approval and adoption. (See Appendix B6: Sample Board Resolution.) The PHA should then establish a date for which these UAs will be effective. The date must be at least 60 days after posting notice.

All residents should have any new UAs reflected in their rent within 30 days of the effective date [24 CFR 965.507(b)].

The PHA's determinations of allowances, scheduled surcharges, and revisions thereof shall be final and valid unless found to be arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law. [24 CFR 965.502(e)]

HUD Review of Allowances

UAs for federally assisted public housing are not subject to approval by HUD before becoming effective. HUD may, however, review the allowances and surcharges during the course of regular audits or reviews of PHA operations.

7 Energy Efficiency

CHAPTER 7: Energy Efficiency

CHAPTER OVERVIEW: This chapter provides information regarding energy conservation education and energy efficiency measures that help lower utility costs. It also discusses how management of utility systems and resident's behavior issues can affect utility allowances. This chapter also addresses Energy Audits and ESCOs and their relationship to utility allowances.

Public Housing Agencies (PHAs) should recognize the importance of an ongoing energy conservation education effort, particularly aimed at residents whose consumption exceeds their allowance. Such outreach and education efforts that result in energy conservation by residents will not only benefit the individual households experiencing surcharges, but will also reduce the PHA's overall utility use and costs.

The PHA should remain alert to weatherization measures and equipment upgrading that the agency could undertake that would reduce resident utility consumption.

Following more than four years of debate, the United States enacted a comprehensive energy bill in 2005. The Energy Policy Act of 2005 (Pub.L. 109-058, H.R.6) was signed into law by President George W. Bush on August 8, 2005. The first comprehensive revision to energy policy since 1992, this Act has the following sections impacting energy issues as they relate to public housing.

Section 151

Section 151 of the bill permits funds from the Public Housing Capitol Fund to be used for improvements to maximize energy and water use efficiency in public housing. It also permits PHAs to engage in contracts with outside vendors that maximize energy efficiency.

Section 152

Section 152 directs PHAs to purchase appliances designated by ENERGY STAR® or by Federal Energy Management Program (FEMP) as designated products, unless the purchase of energy-efficient appliances is not cost effective to the PHA.

Section 153

Section 153 requires new public housing that is funded by HOPE VI revitalization grants to meet the 2003 International Energy Conservation Code (IECC) by September 30, 2006.

Section 154

Section 154 legislation requires HUD to develop a strategy to reduce utility cost through energy-efficiency measures and energy-efficient design and construction of public and assisted housing. The Department's first report was submitted to Congress on August 8, 2006, Promoting Energy Efficiency at HUD in time of Change Report, and subsequent updates biennially.

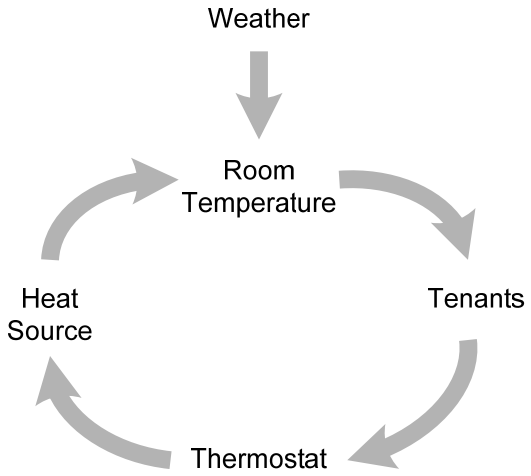
Optimizing the energy efficiency in public housing ultimately rests not only on changes in the structure and equipment of the buildings, but also on the actions of PHA management, staff, and residents. This includes understanding proper use of equipment and energy costs, training for operating and maintenance, establishing accountability, and providing the correct balance of human versus automatic and mechanical control.

System Management, Control and Behavioral Issues

It is through the management and control of a building's energy-using components that the physical and behavioral aspects of energy use are linked. Approaches for controlling a building's energy use include individual meter reading, thermostatic controls, and Energy Management Systems (EMS). Decisions regarding the control of energy within PHAs are affected by staff training and responsibilities, resident awareness and responsibilities, and specifications for control devices such as radiator valves and thermostats.

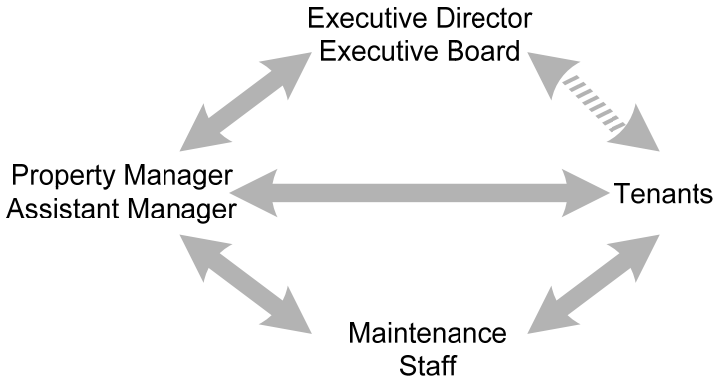
It is important to include feedback into the development of EMS. Feedback entails observing the outcome of a process and then feeding the information back to whomever or whatever controls they process. Feedback is crucial at many levels – some physical and some informational. A thermostat is the archetypical physical feedback mechanism; it senses the temperature inside a building and provides a signal back to a boiler about whether or not heat is required. Conservation practitioners know that if there is a failure to understand operation, thermostats can be one of the biggest problem areas in a building.

Figure 2: Physical Feedback in a Thermostat



The other level of feedback regards informational feedback. Unlike the physical feedback loop described above, informational feedback goes in both directions: from the PHA to the residents and from the residents to the PHA. The most effective informational feedback will not be limited to PHA line staff, but will go up to the Executive Director. This feedback is particularly critical for it involves the resident who may pay part of the bill, as well as, those who make decisions concerning utility allowances (UAs) and building equipment choice and operation.

Figure 3: Informational Feedback



The nature of system management and control depends on the physical and operational mechanisms for measuring energy use and comfort, and then conveying this information back to a building's staff and residents. Those PHAs who promote positive

interactive feedback with their residents can experience a spirit of collaboration, which in turn can create a positive effect on building operations.

Energy efficiency should be an integral part of every PHA's operations and capital improvement planning process. The most compelling reason for any PHA to make energy conservation improvements is the potential for significantly reduced energy costs. The extent to which reduced energy costs will impact a PHA's operating budget depends on the method of funding the improvements. If a PHA chooses to utilize the services of an Energy Service Company (ESCO), after implementation of the EMSs, the PHA updates the UAs in accordance with provisions in 24 CFR Part 965, Subpart E. The new allowances should be lower than baseline allowances; the PHA uses at least 75 percent of the savings for paying the cost of the improvement (the PHA will be permitted to retain 100 percent of the difference between the baseline allowances and revised allowances) for the life of the loan. Additional resource information may be found in Appendix A.

The key to a sound energy improvement program and an EMS is a good Energy Audit (EA) [24 CFR 990.301]. Regulations require an EA to be completed every five years for each property in a PHA's portfolio, but an EA can be conducted any time to support comprehensive modernization or equipment purchases. An EA provides analysis of a building's energy systems and offers planning information that allows building managers to assess opportunities for excessive utility cost avoidance. Properly completed, an EA supports integrated planning of capital investments, operating improvements, and maintenance cost reductions.

There are three kinds of EAs: walk-through audits, general engineering audits, and investment grade audits (or detailed engineering studies):

- ***Walk-through energy audit:*** A walk-through EA is used to rank development opportunities and establish a scope for a more detailed EA that, if warranted, will determine costs and savings for each measure. A walk-through EA should provide a brief discussion of existing conditions, a snap shot of utility consumption and costs, and offer a brief discussion of potential conservation measures at each development. The auditor in a walk-through is often an experienced energy auditor or a certified home energy rater who has completed numerous, more detailed energy audits. Optional: systems performance testing (e.g., blower door) may be utilized.
- ***General engineering audit:*** In the engineering audit, an energy auditor completes an analysis of utility costs and savings for all cost effective

conservation measures and savings at each property. Utility data is analyzed, trended, and benchmarked and then used to establish the available savings for each recommended conservation measure. Costs are generally developed through industry norms or available historical development information, and the energy auditor is often an experienced engineer, architect, certified auditor/inspector, an accredited home energy rating system (HERS) provider, or a team of auditors overseen by a licensed engineer or other qualified individual. Optional: systems performance testing (e.g., blower door) may be utilized.

- ***Investment grade energy audit:*** An investment grade EA (or detailed engineering study) adds equipment testing and energy monitoring to the engineering audit to more accurately development savings for specific end-uses. The detailed engineering study may also request actual prices for construction and project management. A detailed energy study is more expensive to complete but warranted where capital investments will be financed from the resulting energy savings. Systems performance testing (e.g., blower door, duct blower, thermo imaging, flow rate [GPM], etc.) is generally required for this type of audit. Licensed architects or engineers, accredited HERS providers, certified energy managers, energy services companies (ESCO), energy services providers (ESP), or other qualified entities generally conduct these audits.

Using an Energy Audit in Capital and Maintenance Planning

HUD requires PHAs use EAs in planning capital projects. To better plan for implementing EAs and to more effectively utilize EA results in capital planning, it is important for a PHA to consider what information an EA can provide and how that information can be used. EAs generally include the following four components: physical inspection and equipment/systems testing, utility bill analysis, recommended energy efficient opportunities, and incremental investment analysis.

Physical Inspection and Equipment/System Testing

An EA begins with a physical inspection and data collection for all facilities and energy-related equipment. The inspection and data collection would review equipment conditions, past maintenance schedules, remaining useful life, and system performance. Evaluations should also consider such factors as heat exchanger damage, high humidity, poor temperature control, and comfort concerns. Additionally the EA could include testing of air infiltration (blower door), duct leakage, Carbon

Monoxide/Exhaust Gas efficiency analysis, pressure testing, and flow rate testing for water conservation devices.

Utility Bill Analysis

Utility bills for each property are collected and analyzed to evaluate the effects of weather and irregular behavior. The utility bill analysis also separates end-uses. Where resident-paid utilities are involved, the energy auditor should review the PHA's most recent UA study, which will either provide samples of resident-paid utility bills or an engineering calculation of estimated consumption by use. The analysis should compare normalized energy consumption among the housing developments in the PHA's portfolio and, where available, against available actual consumption data from the properties.

Energy Efficiency Opportunities

Energy efficiency recommendations should be based on engineering and economic analyses of such factors as operating hours, equipment efficiency, and building and occupant energy demand characteristics. The analyses should discuss important assumptions and provide summary recommendations. Recommendations should be in the form of Energy Conservation Measures (ECMs) with estimated pay back periods on PHA investments. See U.S. Department of Housing and Urban Development Energy Conservation for Housing: A Workbook, 1998. (See website: http://www.abtassoc.com/reports/D19980034.pdf)

Incremental Investment Analysis

A concern in energy audits has been the failure to complete incremental investment analysis, which is an important consideration for modernization and routine maintenance projects. Equipment nearing the end of useful life or failing catastrophically will require a replacement whether or not the retrofit can pay for itself. A heating or cooling system, for example, may fall into this category. Simple paybacks for these systems can often be longer than 25 years due to the high first costs for equipment and installation. If the equipment must be replaced to prevent unscheduled failure, an economic analysis should be conducted that evaluates installed costs (i.e., first cost). Comparisons can then be made to consider alternative equipment options using incremental cost and savings differences against a base.

Modernization projects typically develop capital plans based on a physical needs assessment (PNA) that ranks investment priorities prior to developing capital funding plans. Capital Fund Program planning resides in a different budget center for PHAs

than utilities, PHA Executive Directors seeking to better integrate their utility management practices into spending decisions will need to coordinate their decision making with all those involved. Having a well-developed EA and using the results in coordination with PNA will allow a PHA to incorporate effective utility management in capital investment priorities.

PHAs often outsource their EAs. This is logical since EAs are completed infrequently and qualified auditors require specialized skills and ongoing training. To get an EA that fits a PHA's planning requirements, it is important to develop a clear scope of work and identify the skills and capabilities required from potential firms. The scope should outline the requirements for the EA, minimum methods to be used, and skill levels sought (e.g., certified energy home rater/auditor). Where a PHA may need to complete a UA study EA, and/or a PNA, these requirements are complimentary to the project and may produce economies of sale in a combined procurement. A properly specified procurement package will result in the selection of firms with the necessary experience or capability.

Energy Audit Regulations

HUD regulations at 24 CFR 965 Subpart C provides requirements to PHAs on completing EAs. These regulations only apply to public housing and do not apply to Indian Housing Authorities, Section 8 Project-Based assisted housing developments, and resident-based Section 8 Housing Choice Voucher Program (HCVP) assisted developments.

PHAs must complete an energy audit for each applicable property every five years. The EA must analyze all ECMs that pertain to each building type and provide the associated payback periods. All cost effective measures must be implemented within capital funds that are available. HUD suggests that ECMs be ranked by payback and funded in increasing payback order. The order can be adjusted if funds are insufficient for all cost effective measures or where long payback items would be more effectively completed under modernization. Regulations require that PHAs fund conservation measures first from operating funds to the extent feasible, and then seek alternative sources such as operating reserves, capital funds, or redevelopment funds where available. PHAs may also use third-party financing, but HUD must agree to provide adjustments to subsidy eligibility that allows the debt service to be paid from anticipated utility cost reductions.

HUD requires replacement equipment to meet or exceed minimum efficiency requirements established by the U.S. Department of Energy (DOE) and requires PHAs

to manage operations to maximize energy conservation. ENERGY STAR® rated equipment and appliances is strongly recommended.

Where available from states and utility companies, funding for efficiency improvements should be identified and quantified in the EA. Currently there are 17 states where electricity restructuring is active and 18 states where natural gas unbundling is available. In many of these states (e.g., California, New York, Wisconsin) system benefit charges are applied to utility consumption and the funds are set aside for energy management and efficiency programs. In states fully regulated, many utilities and state energy offices may have limited funding available for efficiency developments.

Third-party financing, known as Energy Performance Contracting (EPC), is a potential funding source for modernization projects [24 CFR 990]. Performance contracts require an assessment of project potential, selection of a qualified energy services firm, review of financial and engineering calculations, independent commissioning and measurement and verification. These projects require expertise in energy management. PHAs might consider working with an experienced professional familiar with performance contracting to plan and develop these kinds of energy projects, especially on initial or complicated efforts. Numerous PHAs are implementing self-directed projects and acting as ESCOs. Advantages for PHAs to be self-directed include: lower costs, not overhead, profit, increasing staff knowledge of operating systems, better integration with Capital Funds and asset management strategies. The PHAs staff workload must be flexible, and staff must have at least moderate construction administration experience and a high level of interest about the EPC process. [EcoWise articles: July 2008 and September 2008]

PHAs receive funding for large, non-recurring maintenance improvements through the Capital Fund program, which requires five year and annual planning. Under 24 CFR 968.115, PHAs must incorporate cost-effective ECMs as identified in their most recently updated EAs.

Energy Service Companies (ESCOs) – A Way to Control Utility Costs

Along with the requirements of successful asset management projects, the digital economy and an expanded energy market have boosted PHA managers' and Executive Directors' interest in controlling energy costs and increasing power quality and reliability for their respective developments. PHAs are large consumers of power, so they should begin to leverage that power by establishing relationships with utility companies. Advances in power generation equipment and efficiencies, as well as expanded

information-gathering options and energy services, make the time ripe to explore energy management alternatives that heretofore may have been overlooked.

PHAs are today more than ever searching for ways to retrofit their agencies with the latest equipment designed to facilitate energy conservation. An ESCO, or Energy Service Company, is a business that develops, installs, and finances projects designed to improve the energy efficiency and maintenance costs for developments over a 20-year time period. ESCOs generally act as project developers for a wide range of tasks and assume the technical and performance risk associated with the project. Typically, they offer the following services:

- Develop, design, and finance energy efficiency developments;
- Install and maintain the energy efficient equipment involved;
- Measure, monitor, and verify the development's energy savings;
- Assume the risk that the development will save the amount of energy guaranteed.

These services are bundled into the development's capital improvement cost and are repaid through the energy cost savings generated.

As mentioned previously, numerous PHAs are acting as self-directed ESCOs. Self-directed EPCs make a lot of sense for PHAs of all sizes, but especially for those PHAs with fewer than 500 dwelling units. PHAs will need to be familiar with HUD's streamlined EPC procedures. They will need to obtain or research such information as: 3 years of utility consumption history, local utility rates, and building characteristics (e.g., what's old, what's new, what works and what doesn't work). [EcoWise articles: July 2008 and September 2008]

ESCO projects are comprehensive, which means that the ESCOs employ a wide array of cost-effective measures to achieve energy savings. These measures often include the following: water conservation, high efficiency lighting, high efficiency heating and air conditioning, efficient motors and variable speed drives, and centralized EMSs.

What sets ESCOs apart from other firms that offer energy efficiency such as consulting firms and equipment contractors is the concept of performance-based contracting? When an ESCO undertakes a project, the company's compensation, and often the project's financing, is directly linked to the amount of energy that is actually saved.

Typically, the comprehensive energy efficiency retrofits inherent in ESCO projects require a large initial capital investment and offer a relatively long payback period for public housing. The PHA's debt payments are tied to the energy savings offered under the project so that the PHA pays for the capital improvement with the money that comes out of the difference between pre-installation and post-installation energy use and other costs. For this reason, ESCOs have led the effort to verify, rather than estimate energy savings. One of the most accurate means of measurement is the practice of metering, which is direct tracking of energy savings according to sanctioned measurement and verification protocols. These are available at the HUD Public Housing Environmental and Conservation Clearinghouse (PHECC) website. (http://www.hud.gov/offices/pih/programs/ph/phecc/eperformance.cfm)

Most performance-based energy efficiency projects include the maintenance of all or some portion of the new high-energy equipment over the life of the contract. The cost of this ongoing maintenance is folded into the overall cost of the project. Over the life of the contract, the PHA receives the benefit of reduced maintenance costs in addition to reduced energy costs. As an additional service in most contracts, the ESCO provides specialized training needed so that the PHA's maintenance staff can take over at the end of the contract performance period.

Another critical component of every energy efficiency project is the education of PHA staff and residents about their energy use patterns. Understanding how their energy use is related to lifestyle is critical for the development of an "energy efficiency partnership" between the ESCO and the PHA. This component is most critical in a public housing environment where residents may not be used to paying the utility bills generated by their own consumption.

Included in the ancillary services provided in a typical performance-based energy efficiency contract are the removal and disposal of hazardous materials from the PHA's facility. When, for example, existing fluorescent lighting equipment, ballasts that contain PCBs (Poly Chlorinated Biphenyl), and fluorescent light tubes that contain traces of mercury are replaced, the old equipment must be disposed of as hazardous waste. Upgrades to heating, air conditioning, and ventilation systems may involve the removal of asbestos and would also be properly disposed of by the ESCO.

A Appendixes

APPENDIX A: INFORMATION RESOURCES

The following resources are provided for information purposes only. The U.S. Department of Housing and Urban Development (HUD) does not endorse or necessarily agree with all the content contained in the following resources. These resources and contact information is subject to change.

HUD's Resources:

HUD's Client Information and Policy System (HUDCLIPS)

On-line resource for forms, handbooks, policies, and other related information:

http://www.hudclips.org/cgi/index.cgi

HUD Public Housing Environmental and Conservation Clearinghouse (PHECC)

On-line resource for information related to Energy Performance Contracting:

http://www.hud.gov/offices/pih/programs/ph/phecc/eperformance.cfm

On-line resource for overview of some of the key principles underlying the establishment of utility allowances:

http://www.hud.gov/offices/pih/programs/ph/phecc/allowances.cfm

HUD Public Housing Occupancy Guidebook, June 2003

Weather or Climate Data Information:

National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC)

On-line resource for heating degree days data (can order by state and weather center location):

http://www5.ncdc.noaa.gov/cgi-bin/climatenormals/climatenormals.pl

On-line resource for U.S. weather recorded normals (CLIM81):

http://www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

Energy Information:

HUD Energy Conservation for Housing: A Workbook, 1998

U.S. Department of Energy (DOE)

http://www.eia.doe.gov/

On-line resource for average amount of kilowatt hours used by household appliance and plug load estimates:

http://www.eia.doe.gov/emeu/recs/recs2001/publicuse2001.html

On-line resource for building energy software tools:

U.S. DOE's Energy Efficiency and Renewable Energy (EERE)

http://www.eere.energy.gov/buildings/tools_directory

APPENDIX A: INFORMATION RESOURCES (continued)

Energy Information: (continued)

On-line resource for information related to Energy Conservation Measures (ECMs):

http://www.abtassoc.com/reports/D19980034.pdf

On-line resource for building energy performance:

Residential Energy Services Network (RESNET)

http://www.natresnet.org/programs/software/directory.htm

On-line resource for green building performance education:

Energy and Environmental Building Association (EEBA)

http://www.eeba.org/

On-line resource for advanced energy technologies:

U.S. Department of Energy (DOE)-Oak Ridge Office

http://www.ornl.gov/sci/btc/apps/

Environmental energy Technologies Division

http://eetd.lbl.gov/coolroof/

Efficient Lighting Information:

On-line resource for efficient lighting fixtures, lighting education, and frequently asked questions:

http://www.elflist.com/

Water Information:

Environmental Protection Agency (EPA)

On-line resource for residential water conservation techniques:

Software for Environmental Awareness (SEAHOME)

http://www.epa.gov/seahome/watcon.html

On-line resource for water information:

EPA Office of Water (OW)

http://www.epa.gov/OW/you/chap3.html

Utility and Energy Software and Services:

Abraxas Energy Consulting-Utility bill tracking software:

http://www.energy-accounting.com

Energy Watchdog-Energy tracking and utility management software:

http://www.energywatchdog.com

APPENDIX A: INFORMATION RESOURCES (continued)

Utility and Energy Software and Services: (continued)

Utility Management Services

On-line resource for utility management services and software:

http://www.utilityaccounting.com

Stellar Processes, Inc.

On-line resource for utility management services and software:

http://www.ezsim.com/

Gathering Utility Rates and Charges:

Database of State Incentives for Renewables and Efficiency

On-line resource for state, local, utility and federal incentives:

www.dsireusa.org

Many utility provides maintain an individual website and post their rates and charges State Public Utility Commission's have websites and sometimes list local utility company electric or gas rates.

APPENDIX B: SAMPLE FORMS AND HELPFUL INFORMATION

1: SAMPLE REQUEST FOR PROPOSAL (RFP)

(For Advertising/Posting)

SAMPLE

REQUEST FOR PROPOSALS (RFP)

Solicitation No.: _____

Low-Rent Public Housing Utility Allowance Study

The _____ Housing Authority (hereinafter referred to as the Agency) will accept competitive sealed proposals for an experienced consulting firm to conduct a Low-Rent Public Housing Utility Allowance Survey and Study for it's _____ conventional housing units which utilize utility allowances and which would approximate a reasonable consumption of utilities by an energy-conservative household of modest circumstances consistent with the requirements of a safe, sanitary, and healthful living environment.

Utility allowances will be determined using an ***(Note to PHA: choose both methods or one method)*** **actual/historical consumption-based method / an engineering-based method** and will be conducted in accordance with 24 CFR Part 965, Subpart E, Tenant Allowances for Utilities.

Deadline to submit proposals and credentials is 4:30 p.m. on_____at the address listed below. RFP's can be obtained Monday through Friday between the hours of 9:00 A.M. and 4:00 P.M. at_____. All proposals should be sent to:

_____, Executive Director
_____Housing Authority
_____
_____

For information contact _____at (___) _____. The Agency reserves the right to reject any or all proposals. The Agency is an equal opportunity employer and contracting agency.

SAMPLE

Request for Proposals (RFP)

Solicitation No.: _____

LOW-RENT PUBLIC HOUSING UTILITY ALLOWANCE STUDY

I. SCOPE OF SERVICES

The _____ Housing Authority (hereinafter referred to as the Agency) will accept competitive sealed proposals for an experienced consulting firm to conduct a Low-Rent Public Housing Utility Allowance Study for it's _____ conventional housing units located at _____ developments/sites which utilize utility allowances and which would approximate a reasonable consumption of utilities by an energy-conservative household of modest circumstances consistent with the requirements of a safe, sanitary, and healthful living environment. Utility allowances will be determined using an ***(Note to PHA: choose both methods or one method)*** **actual/historical consumption-based method / an engineering-based method** and will be conducted in accordance with 24 CFR Part 965, Subpart E, Tenant Allowances for Utilities.

The contractor will establish utility allowances for the following housing developments:

(Note to PHA: Complete the chart below and check the appropriate box(s) for resident-paid utilities. Write C-M if utilities are paid by the Agency and units are individually metered.)

Development Name and Number	Total Number of Units	Structure Type	Resident-Paid Utilities			Air Conditioning?	
			Electric	Natural Gas	Water/ Sewer	Central	Window

A. Collection of Data and Analysis ***(If utilizing an actual/historical consumption-based method)***

Due to privacy issues, the Agency will assist in the requisition of adequate actual historical data from the local utility companies for Resident-Paid Utilities for each dwelling unit category and unit size by development. If the utility company requires signed resident releases (with or without account numbers) the Agency will gather these resident releases and provide a copy to the appropriate utility companies along with a specific request for actual historical data, on agency letterhead. The study should be conducted using a U. S. Department of Housing and Urban Development (HUD) acceptable statistical model and methodology. Necessary adjustments should be made for climatic conditions, unit vacancies, etc.

B. Recommended sources of data shall be, but not limited to:

- Consumption information from the Agency, residents, and/or utility suppliers
- Energy audits
- Physical inspections of representative units
- building plans and modernization documentation
- Interviews of residents to obtain insight into energy usage
- Interviews of maintenance personnel and project managers to gain understanding of HVAC equipment and how housing facilities are used by residents.

C. The study should be conducted with Agency staff and resident participation.

The timeframe for completing the above services will be 120 days from the date of contract execution.

Interested proposers must respond with:

1. Detailed description of how proposed services will be provided.
2. Listing of the deliverables the Agency will receive.
3. Proposals demonstrating an understanding of the required services of the Agency, meeting regularly recognized HUD policies, guidelines, and procedures governing the administration of a Public Housing Authority.
4. Provide written evidence of the firm's ability to perform the services.
5. Summary profiles of the firm's principals, staff and associates who will be assigned to the project.
6. At least 3 references
7. Fixed Price cost estimate to provide the proposed services.

8. Any additional information that will assist the Agency in evaluating the firm's capability to perform the proposed services.

(Note to PHA: the following items can also be requested at this time or before awarding the contract)

9. Proof of Insurance Coverage
10. Non-Collusive Affidavit
11. Equal Opportunity Statement
12. Certifications and Representations of Offerors (Form HUD-5369-C)
13. Certification Regarding Debarment and Suspension (Form HUD-2992)

The Agency will accept one faxed, mailed, or delivered proposal until 4:30 p.m. on_____ (date). Please address all proposals to:

_____, Executive Director
_____Housing Authority
_____
_____

II. ELIGIBILITY TO SUBMIT PROPOSAL

In order to be considered eligible to submit proposal, each organization, individual, or firm must submit written evidence with its proposal demonstrating that it fulfills the following eligibility criteria:

1. The proposer has a minimum of one year experience working for or contracting with a housing agency and/or related housing or government agencies. Must have experience in conducting utilities studies, needs assessments, regulation compliance, tenant services, the Capital Fund Program, and/or other public housing programs.

2. A minimum of 3 references with telephone numbers of housing agencies where work has been performed and/or Agency staff participating in training sessions.

3. A certification statement that the proposer is not debarred, suspended, or otherwise prohibited from professional practice by any federal, state, or local agency.

III. FACTORS FOR AWARD OF CONTRACT

In addition to eligibility criteria and requirements addressed in 24 CFR Part 965, Subpart E, Tenant Allowances for Utilities, the following criteria is relative to this RFP and the proposer should address each of these factors as they will be considered when determining the contract award.

A. Experience in working with Public Housing Authority programs, HUD programs, and/or other government or private entities. Responsiveness to the RFP's Scope of Services. (30 points maximum).

B. Approach and experience in conducting utility allowance studies. (30 points maximum)

C. Staff. Description of organization's staff and experience in HUD programs, and previous Agency technical assistance, Agency energy surveys, and physical and management needs assessment projects. (30 points maximum)

D. Acceptance by HUD Field Office of proposer organization.

E. All proposers must carry the following insurance policies: required workmen's compensation, general liability and professional liability of no less than $1 million and non-owners auto insurance. (15 points maximum)

F. Price. Total cost of services to be provided shall be described. (5 points maximum)

G. Timing. Proposer shall describe start and schedule of activities to be performed. (15 points maximum)

H. Minority business enterprise, Section 3 business concern, and/or women owned business. (5 points maximum)

I. Subject to Other Documents. The contract is subject to the terms and conditions of the State of Mississippi as they exist at the time the agreement is signed.

J. Binding Effect. The contract shall be binding upon and shall inure to the benefit of the successors and the assigns of the Agency, and to the heirs and personal representatives of the consultant.

K. Conflict of Interest. The consulting firm warrants that it presently has no interest and will not acquire any interest direct or indirect, which would conflict in any manner or degree with the performance of services under this contract.

L. Award of Contract. The award shall be made to the responsible party whose proposal is most advantageous to the Agency, taking into consideration the evaluation factors set forth in this request for proposals.

M. Envelopes. Proposal envelopes and/or fax cover page shall be clearly marked to indicate that a proposal is enclosed. Please identify at lower

left hand corner of envelope or top of fax cover page "Low-Rent Public Housing Utility Allowance Study".

N. The Proposer warrants adhering to civil rights, equal opportunity, fair housing, and Section 3 regulations.

O. Responsibility. It shall be the responsibility of the Proposer to see that their proposal is received by the PHA by the date and time set for the opening of the proposals. Proposals received after the time stated shall not be considered.

P. Rejection of Proposals. The PHA reserves the right to accept or reject any or all proposals which are determined to be non-responsive.

IV. MATERIALS

All assessment materials and manuals and/or software necessary for the execution of this contract will be developed by the contractor.

V. PAYMENT OF CONSULTANT/CONTRACTOR FEES

Upon execution of contract, contractor shall receive initial payment for start-up labor, materials and miscellaneous expenses. Thereafter, Contractor shall submit itemized invoices to the Agency on a monthly basis. Contractor's invoices shall be processed and payment made to Contractor in accordance with the policy and procedure of the Agency.

VI. AWARD OF CONTRACT

The proposals which are received will be evaluated by a committee consisting of the Executive Director, another staff person, and a representative from the Board of Commissioners. All proposals will be evaluated on eligibility criteria and factors for awards previously stated above.

The Agency reserves the right to reject any or all proposals, to waive any informality in proposals and unless otherwise specified by the Agency or proposer to accept any items in the proposal.

APPENDIX B: SAMPLE FORMS AND HELPFUL INFORMATION

2: SAMPLE REQUEST FOR QUOTATION (RFQ)

SAMPLE

Request for Quotation (RFQ)

Solicitation No.: _____

LOW-RENT PUBLIC HOUSING UTILITY ALLOWANCE STUDY

TO: All Prospective Offerors
TRANSMITTED VIA ___ E-mail ___ Fax

SUBJECT: Request for Quotations (RFQ) for Low-Rent Public Housing Utility Allowance Study

DATE: _____

The _____Housing Authority (PHA) has an immediate requirement to solicit an experienced consulting firm to conduct a Low-Rent Public Housing Utility Allowance Study for its _____ conventional housing units located at _____ developments/sites which utilize utility allowances. The PHA is utilizing its Statement of Procurement Policy for small purchases.

I. STATEMENT OF WORK

Utility allowances will be determined using an ***(Note to PHA: choose both methods or one method)*** **actual/historical consumption-based method / an engineering-based method** and will be conducted in accordance with 24 CFR Part 965, Subpart E, Tenant Allowances for Utilities.

The contractor will establish utility allowances for the following housing developments:

(Note to PHA: Complete the chart below and check the appropriate box(s) for resident-paid utilities. Write C-M if utilities are paid by the Agency and units are individually metered.)

Development Name and Number	Total Number of Units	Structure Type	Resident-Paid Utilities			Air Conditioning?	
			Electric	Natural Gas	Water/ Sewer	Central	Window

Collection of Data and Analysis ***(If utilizing an actual/historical consumption-based method)***

The Agency will assist in the requisition of adequate actual historical data from the local utility companies for Resident-Paid Utilities for each dwelling unit category and unit size by development. If the utility company requires signed resident releases (with or without account numbers) the Agency will gather these resident releases and provide a copy to the appropriate utility companies along with a specific request for actual historical data, on agency letterhead. The study should be conducted using a U. S. Department of Housing and Urban Development (HUD) acceptable statistical model and methodology. Necessary adjustments should be made for climatic conditions, unit vacancies, etc.

II. REQUIRED INFORMATION

A. Required Certifications and Affidavits

The following forms are attached and are part of the RFQ documents. Some forms require completion and your signature; these forms **must be returned** with your quotation.

- Firm Profile ***(Return with Quote)***
- Certification and Representation of Offerors (Form HUD 5369-C) ***(Return with Quote)***
- Certification for a Drug-Free Workplace (Form HUD 50070) ***(Return with Quote)***
- Instruction to Offers (Form HUD-5369-B)
- General Contract Conditions (Form HUD 5370-C)

B. Documentation of Insurance

Evidence of General Liability insurance in the amount of $1,000,000 and Workers' Compensation insurance in the amount required by the State of Alabama must be provided upon the award of a contract.

III. TIMEFRAME FOR COMPLETION

The timeframe for completing the above services will be 120 days from the date of contract execution.

The PHA may not necessarily proceed with an award based on the initial proposal quotations received and reserves the right to discuss contents of such proposals, to obtain additional information, and to negotiate changes in the proposals.

The PHA reserves the right to reject any or all quotations and to waive any informality. The PHA may also reject any proposals that are incomplete or non-responsive and any proposals that are submitted after the deadline. The PHA reserves the right to accept or reject, in part, or reject all proposals and to re-solicit new proposals.

IV. SUBMISSION DEADLINE:

Please submit your quotation **no later than 4:30 p.m**. on _____**.**
Facsimile and electronic transmissions will be accepted.

SUBMIT TO: _____
_____ Housing Authority
Fax Number: (____) ____-_____
E-mail: _____

V. FIRM-FIXED PRICE (FFP) Fee: Compensation should be based on a firm-fixed price (FFP) with no additional charges for routine expenses.

$ _____
(*Includes travel, if applicable, and expenses)*

NAME OF OFFEROR: _____

ADDRESS: _____

CITY: _____

STATE & ZIP CODE: _____

PHONE NO.: _____ FAX NO.:_____

EMAIL: _____

SIGNATURE OF PERSON AUTHORIZED TO SIGN QUOTE:

_____ _____

DATE

TITLE: _____

_____

PRINT NAME

APPENDIX B: SAMPLE FORMS AND HELPFUL INFORMATION

3: DESCRIPTION OF UNIT (BUILDING/STRUCTURE) TYPES

1. Apartment/Walk-Up/Condominium/Garden Apartment/Low Rise

Building with a group of individual units with 2 or more common walls; attached to other units; separate entrances with common staircases; 3 or more stories.

- Each building will have an end unit, inside unit, top unit, bottom unit, etc.
- Usually have units on both sides of building.
- Apartments usually have one owner while condominiums are usually individually owned.

2. High Rise Apartment

A multi-unit building; 5 or more stories; sharing one or more common entrances.

3. Row House/Townhouse/Triplex/Fourplex/Multiplex

An individual unit attached to 2 or more other individual units; 2 or more common walls; separate ground level entrances; 1 or 2 story units.

- Each building will have end units and inside units.
- Fourplex units usually share 2 common walls; can be square-shaped or L-shaped.
- Triplex building can be V-shaped.

4. Semi-Detached/Duplex

Building with 2 individual housing units; with separate entrances; one common wall; 1 or 2 story units.

5. Detached House

A detached building intended to house one family; sits on its own piece of land; not attached to another dwelling.

6. Manufactured/Mobile Home

A detached movable or portable housing structure; at least 32 feet in length and over 8 feet in width; constructed to be towed on its own chassis and designed to be installed with or without a permanent foundation.

- May be 2 or more units fitted together to make one residence.

APPENDIX B: SAMPLE FORMS AND HELPFUL INFORMATION

4: SAMPLE RESIDENT RELEASE OF INFORMATION FORM

SAMPLE

TO WHOM IT MAY CONCERN:

I agree that as long as I remain a resident of the Housing Authority of ____ **(Agency Name)** ____, I authorize the release of Utility Consumptions, costs and rates from _____ **(utility supplier's name)** _____**.** I understand that this information will be kept confidential and will be used only for program purposes. I further agree that a copy of this release shall serve the same as an original.

Signed this _____ Day of _____, _____

Development Name: _____ Number of Bedrooms: _____

Authorized Signature: _____

Name: (please print clearly) _____

Street Address: _____

City, State, Zip Code: _____

My **Electric** Company Account# _____

My **Gas** Company Account#_____

My **Water** Company Account#_____

Important Note: Most utility suppliers will accept a copy this Resident Release of Information Form. However, there are some utility suppliers with their own authorized form, and some utility suppliers may require additional information. Check with your local utility suppliers to obtain their requirements for requesting release of information.

APPENDIX B: SAMPLE FORMS AND HELPFUL INFORMATION

5: SAMPLE INDIVIDUAL RELIEF REQUEST FORM

Anytown PHA
555 Main Street
City, State, Zip

_____ _____
Resident's Name Resident's Phone Number

_____ _____
Resident's Address City, State, Zip

Type of Relief Requested:

___ Surcharge(s) on excess consumption from Consumption Allowances
___ Payment of utility billings in excess of my Utility Allowance

1. Are there any members of your household that are 62 years of age or older?
   ___ Yes ___ No ___ Number

2. Are there any disabled or ill members of your household?
   ___ Yes ___ No ___ Number

3. Does anyone in your household use medical equipment powered by a utility?
   ___ Yes ___ No

4. If yes, what medical equipment is used? _____

5. What utilities does your household pay for?
   ___ Electric ___ Gas ___ Water ___Sewer ___Trash

6. Which utility heats your home?
   ___Electric ___ Gas ___Coal ___Wood ___Propane

   ___Other (Please specify) _____

7. Does your home have an air conditioner?
   ___ Yes ___ No

8. If yes, which type of system?
   ___Window ___Central

Please state reason(s) for requesting relief:

_____

_____

_____

To the best of my/our knowledge, the information provided here is true and correct. I/We understand that if we knowingly provide false, misleading information, or failed to provide information, that this request may be terminated and all surcharges will be re-instated.

_____ _____
Resident Head-of-Household Signature Date

_____ _____
Interviewer Signature (if other than Manager) Date

_____ _____
Housing or AMP Manager's Signature Date

FOR OFFICE USE ONLY
Account Number _____
Current Monthly Utility Allowance (total) _____
Amount for each applicable utility: Electric $_____ Gas $_____
Water $_____ Sewer $_____ Trash $_____
Additional Information: _____
_____

MONTHLY AMOUNT OF RELIEF PROVIDED: $ _____

Approved By: _____ Date _____

Denied By: _____ Date _____

Reason(s) for Denial: _____
_____

APPENDIX B: SAMPLE FORMS AND HELPFUL INFORMATION

6: SAMPLE BOARD RESOLUTION

SAMPLE

_____ Housing Authority

Board Resolution No.: _____

Resolution to Adopt Utility Allowance Schedule for Public Housing Developments (as attached) Resident-Purchased Utilities

WHEREAS, HUD regulation 24 CFR 966.502 requires that Public Housing Agencies (PHA) establish allowances for resident purchased utilities for all utilities purchased directly from the utility suppliers, and

WHEREAS: HUD requires the PHA to review their Utility Allowances at least annually; and

WHEREAS, the PHA must revise its allowances for a utility category if there has been a change of 10% or more in the utility rate since the last time the utility allowance schedule was revised; and

WHEREAS, the PHA has completed its annual review and complied with the provision to inform the residents of the planned allowances, surcharges, and revisions; and

WHEREAS: It is the desire and intent of the Board of Commissioners to comply with HUD regulations,

NOW THEREFORE BE IT RESOLVED that the Board of Commissioners of the _____ Housing Authority hereby approves and adopts the Public Housing Utility Allowance Schedule for resident-purchased utilities as presented on this the _____ day of _____, 200_____.

The revised Public Housing Utility Allowance Schedule shall become effective the _____ day of _____, 200_____.

Signatures:

_____ _____

Chairperson - Board of Commissioners Secretary

APPENDIX B: SAMPLE FORMS AND HELPFUL INFORMATION

7: RESIDENTIAL CONSUMPTION OF ELECTRICITY BY END-USE

End Use/Appliance	Households (millions)	Units (million)	Electricity Consumption for 2001 Annual Consumption kWh per unit	kWh per household	Total (billion kWh)	Percent
Total Households	107.0			10,656	1,139.9	100.0
Refrigerators	106.8	126.0	1,239	1,462	156.1	13.7
Air-Conditioning						
Central Air-Conditioners	57.5			2,796	160.6	14.1
Room Air-Conditioners	23.3	38.2	580	950	22.2	1.9
Total					182.8	16.0
Space Heating						
Main Space-Heating Systems	30.9			3,524	109.0	9.6
Secondary Space-Heating Equipment	12.9			503	6.5	0.6
Total					115.5	10.1
Water Heating	40.8			2,552	104.1	9.1
Lighting (indoor and outdoor)	107.0			940	100.5	8.8
Other Appliances (total of list below)	107.0			4,495	480.8	42.2
Clothes Dryer	61.1			1,079	65.9	5.8
Freezer	34.2	37.9	1,039	1,150	39.3	3.5
Furnace Fan	76.3		500		38.2	3.3
Dishwasher	56.7			512	29.0	2.5
Electric Range Top	59.7		536		32.0	2.8
Electric Oven	47.8		440		21.0	1.8
Microwave Oven	92.1		209		19.3	1.7
Electric Toaster Oven	36.1		50		1.8	0.2
Coffee Makers	51.3		116		6.0	0.5
Color TV	105.8	242.6	137	313	33.1	2.9
VCR/DVD	96.1	161.9	70	118	11.3	1.0
Cable Boxes	24.4		120		2.9	0.3
Satellite Dish	13.9		130		1.8	0.2
Personal Computer (Desk Top)	54.2	65.8	262	318	17.2	1.5
Personal Computer (Lap Top)	14.2	16.6	77	90	1.3	0.1
Printer with Fax/copier	12.6		216		2.7	0.2
Printer without Fax/copier	40.2		45		1.8	0.2
Pool Filter/pump	6.5		1,500		9.8	0.9
Pool/Hot Tub/Spa Heater	3.3		2,300		7.6	0.7
Ceiling Fan	69.6	192.8	50	138	9.6	0.8
Clothes Washer	84.1		120		10.1	0.9
Waterbed Heater	5.5	6.4	900	1,035	5.7	0.5
Well Water Pump	13.8		400		5.5	0.5
Dehumidifier	12.1		400		4.8	0.4
Evaporator Cooler	2.7		1,183		3.2	0.3
Compact Stereo System	36.5		81		3.0	0.3

Component Stereo System	36.3	55	2.0	0.2
Portable Stereo (Boom Box)	26.1	19	0.5	0.0
Other Stereo System	3.1	55	0.2	0.0
Large, Heated Aquarium	4.5	548	2.5	0.2
Answering Machine	65.7	35	2.3	0.2
Cordless Telephone	81.5	26	2.1	0.2
Rechargeable Tools	47.7	43	2.1	0.2
Humidifier	15.6	100	1.6	0.1
Automobile Block/Engine/Battery Heater	2.3	200	0.5	0.0
Residual				

Source: U.S. Department of Energy's Residential Energy Consumption Survey 2001 (RECS) these are available at http://www.eia.doe.gov/emeu/recs/recs2001/publicuse2001.html

APPENDIX C: COPY OF HUD REGULATION 24 CFR 965, SUBPART E RESIDENT ALLOWANCES FOR UTILITIES

TITLE 24--HOUSING AND URBAN DEVELOPMENT

CHAPTER IX OFFICE OF ASSISTANT SECRETARY FOR PUBLIC AND INDIAN HOUSING, DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

PART 965: PHA-OWNED OR LEASED PROJECTS GENERAL PROVISIONS

Subpart E--Resident Allowances for Utilities

Source: 61 FR 7971, Feb. 29, 1996, unless otherwise noted.

Sec. 965.501 Applicability.

(a) This subpart E applies to public housing, including the Turnkey III Homeownership Opportunities program. This subpart E also applies to units assisted under sections 10(c) and 23 of the U. S. Housing Act of 1937 (42 U.S.C. 1437 et seq.) as in effect before amendment by the Housing and Community Development Act of 1974 (12 U.S.C. 1706e) and to which 24 CFR part 900 is not applicable. This subpart E does not apply to Indian housing projects (see 24 CFR part 950).

(b) In rental units for which utilities are furnished by the PHA but there are no check-meters to measure the actual utilities consumption of the individual units, residents shall be subject to charges for consumption by resident-owned major appliances, or for optional functions of PHA-furnished equipment, in accordance with Sec. 965.502(e) and 965.506(b), but no utility allowance will be established.

Sec. 965.502 Establishment of utility allowances by PHAs.

(a) PHAs shall establish allowances for PHA-furnished utilities for all check-metered utilities and allowances for resident-purchased utilities for all utilities purchased directly by residents from the utilities suppliers.

(b) The PHA shall maintain a record that documents the basis on which allowances and scheduled surcharges, and revisions thereof, are established and revised. Such record shall be available for inspection by residents.

(c) The PHA shall give notice to all residents of proposed allowances, scheduled surcharges, and revisions thereof. Such notice shall be given, in the manner provided in the lease or homebuyer agreement, not less than 60 days before the proposed effective date of the allowances or scheduled surcharges or revisions; shall describe with reasonable particularity the basis for determination of the allowances, scheduled surcharges, or revisions, including a statement of the specific items of equipment and function whose utility consumption requirements were included in determining the amounts of the allowances or scheduled surcharges; shall notify residents of the place where the PHA's record maintained in accordance with paragraph (b) of this section is

available for inspection; and shall provide all residents an opportunity to submit written comments during a period expiring not less than 30 days before the proposed effective date of the allowances or scheduled surcharges or revisions. Such written comments shall be retained by the PHA and shall be available for inspection by residents.

(d) Schedules of allowances and scheduled surcharges shall not be subject to approval by HUD before becoming effective, but will be reviewed in the course of audits or reviews of PHA operations.

(e) The PHA's determinations of allowances, scheduled surcharges, and revisions thereof shall be final and valid unless found to be arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law.

Sec. 965.503 Categories for establishment of allowances.

Separate allowances shall be established for each utility and for each category of dwelling units determined by the PHA to be reasonably comparable as to factors affecting utility usage.

Sec. 965.504 Period for which allowances are established.

(a) PHA-furnished utilities. Allowances will normally be established on a quarterly basis; however, residents may be surcharged on a monthly basis. The allowances established may provide for seasonal variations.

(b) Resident-purchased utilities. Monthly allowances shall be established. The allowances established may provide for seasonal variations.

Sec. 965.505 Standards for allowances for utilities.

(a) The objective of a PHA in designing methods of establishing utility allowances for each dwelling unit category and unit size shall be to approximate a reasonable consumption of utilities by an energy-conservative household of modest circumstances consistent with the requirements of a safe, sanitary, and healthful living environment.

(b) Allowances for both PHA-furnished and resident-purchased utilities shall be designed to include such reasonable consumption for major equipment or for utility functions furnished by the PHA for all residents (e.g., heating furnace, hot water heater), for essential equipment whether or not furnished by the PHA (e.g., range and refrigerator), and for minor items of equipment (such as toasters and radios) furnished by residents.

(c) The complexity and elaborateness of the methods chosen by the PHA, in its discretion, to achieve the foregoing objective will depend upon the nature of the housing stock, data available to the PHA and the extent of the administrative resources reasonably available to the PHA to be devoted to the collection of such data, the formulation of methods of calculation, and actual calculation and monitoring of the allowances.

(d) In establishing allowances, the PHA shall take into account relevant factors affecting consumption requirements, including:

(1) The equipment and functions intended to be covered by the allowance for which the utility will be used. For instance, natural gas may be used for cooking, heating domestic water, or space heating, or any combination of the three;

(2) The climatic location of the housing projects;

(3) The size of the dwelling units and the number of occupants per dwelling unit;

(4) Type of construction and design of the housing project;

(5) The energy efficiency of PHA-supplied appliances and equipment;

(6) The utility consumption requirements of appliances and equipment whose reasonable consumption is intended to be covered by the total resident payment;

(7) The physical condition, including insulation and weatherization, of the housing project;

(8) Temperature levels intended to be maintained in the unit during the day and at night, and in cold and warm weather; and

(9) Temperature of domestic hot water.

(e) If a PHA installs air conditioning, it shall provide, to the maximum extent economically feasible, systems that give residents the option of choosing to use air conditioning in their units. The design of systems that offer each resident the option to choose air conditioning shall include retail meters or check-meters, and residents shall pay for the energy used in its operation. For systems that offer residents the option to choose air conditioning, the PHA shall not include air conditioning in the utility allowances. For systems that offer residents the option to choose air conditioning but cannot be check-metered, residents are to be surcharged in accordance with Sec. 965.506. If an air conditioning system does not provide for resident option, residents are not to be charged, and these systems should be avoided whenever possible.

Sec. 965.506 Surcharges for excess consumption of PHA-furnished utilities.

(a) For dwelling units subject to allowances for PHA-furnished utilities where check-meters have been installed, the PHA shall establish surcharges for utility consumption in excess of the allowances. Surcharges may be computed on a straight per unit of purchase basis (e.g., cents per kilowatt hour of electricity) or for stated blocks of excess consumption, and shall be based on the PHA's average utility rate. The basis for calculating such surcharges shall be described in the PHA's schedule of allowances. Changes in the dollar amounts of surcharges based directly on changes in the PHA's average utility rate shall not be subject to the advance notice requirements of this section.

(b) For dwelling units served by PHA-furnished utilities where Check-meters have not been installed, the PHA shall establish schedules of surcharges indicating additional dollar amounts residents will be required to pay by reason of estimated utility consumption attributable to resident-owned major appliances or to optional functions of PHA-furnished equipment. Such surcharge schedules shall state the resident-owned equipment (or functions of PHA-furnished equipment) for which surcharges shall be made and the amounts of such charges, which shall be based on the cost to the PHA of the utility consumption estimated to be attributable to reasonable usage of such equipment.

Sec. 965.507 Review and revision of allowances.

(a) Annual review. The PHA shall review at least annually the basis on which utility allowances have been established and, if reasonably required in order to continue adherence to the standards stated in Sec. 965.505, shall establish revised allowances. The review shall include all changes in circumstances (including completion of modernization and/or other energy conservation measures implemented by the PHA) indicating probability of a significant change in reasonable consumption requirements and changes in utility rates.

(b) Revision as a result of rate changes. The PHA may revise its allowances for resident-purchased utilities between annual reviews if there is a rate change (including fuel adjustments) and shall be required to do so if such change, by itself or together with prior rate changes not adjusted for, results in a change of 10 percent or more from the rates on which such allowances were based. Adjustments to resident payments as a result of such changes shall be retroactive to the first day of the month following the month in which the last rate change taken into account in such revision became effective. Such rate changes shall not be subject to the 60 day notice requirement of Sec. 965.502(c).

Sec. 965.508 Individual relief.

Requests for relief from surcharges for excess consumption of PHA-purchased utilities, or from payment of utility supplier billings in excess of the allowances for resident-purchased utilities, may be granted by the PHA on reasonable grounds, such as special needs of elderly, ill or disabled residents, or special factors affecting utility usage not within the control of the resident, as the PHA shall deem appropriate. The PHA's criteria for granting such relief, and procedures for requesting such relief, shall be adopted at the time the PHA adopts the methods and procedures for determining utility allowances. Notice of the availability of such procedures (including identification of the PHA representative with whom initial contact may be made by residents), and the PHA's criteria for granting such relief, shall be included in each notice to residents given in accordance with Sec. 965.502(c) and in the information given to new residents upon admission.

APPENDIX D: GLOSSARY OF KEY TERMS AND DEFINITIONS

This glossary defines terms applicable to the development of utility allowances (UAs). It also defines programmatic terms where they have impact on utility allowances.

30-Year Averages: Are used for the process of normalizing consumption data for weather. When adjusting utility consumption with the 30-year Heating Degree Day factor, the PHA does not to obtain consumption data every year.

Actual Savings: The difference in consumption before and after implementation of efficiency improvements.

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 Form 52722A). The AUCL is computed using the rolling base.

Allowable Utilities Expense Level (AUEL): The estimated level of cost for utilities, computed using the 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.

Asset Management: The process of maximizing the value of a real estate asset based on the investment objectives or mission of an organization or owner.

Base Load: The sum of all allowable utility consumptions (except air conditioning for Public Housing).

Bin: Ranges of temperatures grouped together for analysis purposes.

Block Rate: Refers to a block or stepped rate structure in utility rate schedules.

British Thermal Unit (Btu): The amount of energy required to heat a pound of water 1 degree Fahrenheit. The Btu is the unit commonly used in calculating energy requirements. (It can apply to any energy use, not just heating water; for example, air conditioners are often rated by their Btu capacity.)

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.

Calibration: The process of checking or adjusting a measuring instrument, such as a check-meter. Check-meters need to be calibrated periodically to ensure accurate measurement.

Central Tendency: A measure of the "typical" value in a collection of numbers or a data set. The mean (average) and the median are two different measures of central tendency.

Check-meters: Sub-metering installed to record the energy use of individual apartments where master meters (or one meter per building) record the energy use of the entire building or series of buildings.

Check-metered Utilities: PHAs install separate sub-meters (commonly called check-meters) in addition to the master-meter. These check-meters are used to measure consumption by individual dwelling unit. The PHA owns these check-meters, and as with master-metered utilities, the PHA pays the utility cost directly to the utility provider.

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

Consumption-Based Methodology: One of two suggested methods that can be used to establish utility allowances. (See also engineering-based methodology.) This method is based on actual consumption data from utility bills or check-meter readings. These data are used to estimate the amount of energy or water a household should reasonably require.

Consumption Data: Records obtained from the utility company or from check-meter readings that show how much energy or water was consumed within a given period of time.

Cooling Degree Days (CDD): A measure of the severity of the summer in a given locality: the more cooling degree days, the hotter the summers. Cooling degree days are the difference between 65 degrees F and the daily mean (average) temperature when the latter is more than 65 degrees F.

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

Customer Charge: See meter charge.

Data Set: A set of consumption records for individual dwelling units used to establish an allowance for a given allowance category.

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.

Design Temperature Differential: The design temperature differential, or design range, is the difference between the indoor temperature in winter and the outdoor

design temperature in winter. The design temperature differential is used in calculating the space heating requirements of a dwelling unit under the engineering-based methodology.

End-Use: The functional application or use of a utility, such as space heating, water heating, cooking, lighting, operating appliances, or air conditioning.

Energy Efficiency Rating (EER): A measure of the energy efficiency of an appliance or piece of equipment.

Energy Performance Contracting (EPC): See Performance Contracting.

Engineering-Based Methodology: One of two suggested methods that can be used to establish utility allowances. (See also consumption-based methodology.) This method is based on engineering calculations and other technical information that is used to estimate the amount of energy or water a household should reasonably require.

Equal Payments Plan: A payment plan offered by the local utility company to the resident whereby the seasonal variation in monthly bills is eliminated. A resident on an "equal payments plan" pays 12 equal monthly bills every year, even though utility use may go up or down with the seasons.

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. For housing authorities, 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, resident and staff education, equipment commissioning, maintenance, measuring, verifying, and guaranteeing savings.

Escalation Rate: The rate of change over time of a value such as energy costs. In many performance contracts, it is a stipulated rate of increase in utility rates used in energy savings calculations and guarantees.

ESCO: See Energy Services Company.

Excess Savings: The difference between the amount needed to cover the debt in a performance contract and the actual savings.

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: A fuel charge is an adjustment to the cost of fuel based on the utility's actual cost for fuel. The utility is not allowed to make a profit on this portion of the bill and simply passes these costs through to the consumer.

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.

Heat Loss: The rate of heat transfer, in Btus per hour, from occupied space to the outdoors. Losses occur through walls, ceilings and floors of a structure, and through cracks around windows, doors, etc. The heat loss depends on the dwelling unit size, construction and design of the housing development, the physical condition of the development, amount of insulation in the walls and ceilings, the assumed indoor temperature, and various other factors.

Heating Degree Days (HDD): A measure of the severity of the winter in a given locality: the more heating degree days, the colder the winters. Heating degree days are the difference between 65 degrees F and the daily mean (average) temperature when the latter is less than 65 degrees F.

Housing and Community Development Act of 1987: Key legislation that establishes the regulatory framework for improving the energy efficiency in public housing by providing financial incentives for PHAs 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.

Hundred Cubic Feet (ccf): A common unit of measurement for natural gas and water. One ccf of natural gas is approximately equal to one therm of natural gas. One ccf of water is equal to 748 gallons of water.

Individual Meters (retail meters): One utility meter per apartment. Can be contrasted with a master meter where a single meter serves an entire building or complex.

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 system demand periods.

Kilowatt-hour (kWh): The common unit of measurement for electricity. One kWh is 1,000 watt-hours, or the amount of electricity consumed by a 100-watt lamp in ten hours. One kWh is equal to 3,413 Btus.

Local Distribution Company (LDC): The local utility company that provides energy distribution services (i.e., wires and pipes).

Low-Income Weatherization Assistance Program (WAP): A federally-funded program that provides conservation services and weatherization assistance to households with incomes of below 150 percent of federal poverty level.

Marketer: A power marketer is an agent for power generation projects that sells wholesale power or fuel. Marketers also may arrange for transmission and distribution of the energy provided.

Master Metering: One meter that serves an entire building or a campus of buildings.

MCF: A unit of measurement for natural gas or water that is equal to 1,000 cubic feet. At sea level, one MCF of gas is equal to 1,000,000 Btus.

Mean: A measure of the central tendency of a data set, the mean is the average value in a data set. It is determined by adding all the values and dividing the sum by the number of values in the data set.

Median: A measure of the central tendency of a data set, the median is the middle value in a data set, when the values are ranked from lowest to highest.

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

Non-Allowable End-Use: An end-use whose consumption is excluded from the utility allowance because this use is considered to be a luxury rather than a necessity. It is left to the discretion of individual PHA to distinguish between luxuries and necessities based on local custom and usage patterns. For example, in some regions ceiling fans are seen as an allowable use because of the local climate, whereas in other regions such fans are viewed as luxuries.

Normalization: A mathematical process that adjusts for differences among data from varying sources in order to create a common basis for comparison. In the context of utility allowances, under the consumption based methodology, a PHA may use a fixed set of data on consumption for one or more years, with this data normalized (adjusted) using 30-year weather averages. The normalization corrects for the fluctuations in weather from year to year so that the allowances are calculated on more typical weather patterns.

Outdoor Design Temperature: The lowest outdoor winter temperature that could occur in a given location, based on a 99 percent confidence level. This temperature is used to determine the design temperature differential, which is used in calculating the space heating requirements of a dwelling unit using the engineering-based methodology.

Peak Demand: The greatest electric demand reading during a specified period. Typically, an electric utility charge for the greatest monthly demand measured in 15-minute intervals. The unit of demand is the kilowatt (kW).

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 over time.

Persistence of Savings: Energy or water savings that persist beyond an initial post-retrofit period. 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.

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

Plug Load: All electrical use except space heat, air conditioning, and water heating. Refrigeration and cooking are sometimes added to this list of exclusions.

Princeton Scorekeeping Method (PRISM): A utility billing analysis in which at least 12 months of energy consumption is adjusted for variations in weather.

Project-based Utilities: See PHA-provided utilities.

Public Utility Commission: A commission at the state level that is comprised of either state-elected or appointed officials who regulate utilities such as electric and telephone utilities. The name for this regulatory may differ slightly between states. Public Service Commission is another common name.

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

Resident-Paid (or Purchased) Utilities: Utilities that are paid for by the resident rather than the PHA. Utilities are billed through individual meters and the residents are responsible for paying the bills. Residents receive utility allowances for these utilities.

Rolling Base: The rolling base period is the three-year period used to calculate 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, an ESCO guarantee that the average energy and/or water savings resulting from the conservation retrofit will be equal to that needed to cover the debt service and other fees associated with the project. An ESCO and a housing authority may chose to guarantee an amount higher than that needed to cover project costs.

Section 8 Housing Choice Voucher Program (HCVP): The Section 8 HCV 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).

Shortfall: A negative difference between the amounts needed to cover the debt service and other fees involved in a project (usually the amount of the guaranteed savings) and the actual savings. The ESCOs savings guarantee should cover this shortfall.

Step Rate: See block rate.

Space Heating: The warming of a dwelling unit to a reasonable temperature in the wintertime. Space heating can be provided by any type of heating system; it is not limited to heating provided by portable space heaters.

Statistically Valid Sample: A data set that contains enough data to obtain a reasonable representation of the typical consumption for a given allowance category. The number of records (or sample size) required to make a sample statistically valid depends on how widely the consumption data vary among dwelling units within an allowance category.

Surcharge: The amount a PHA charges a household, in addition to Resident Rent, for consumption of check-metered utilities in excess of the utility allowance, or for non-allowable end-uses.

Resident Rent: The amount paid monthly by the household as rent to the PHA. Where all utilities are supplied by the PHA, Resident Rent equals Total Resident Payment. Where some or all of the utilities are paid directly by the resident to the utility company, then Resident Rent equals Total Resident Payment minus the allowance for resident-purchased utilities.

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.

Therm: A common unit of measurement of natural gas is equal to 100,000 Btus of energy. Depending on its quality, natural gas typically contains approximately 1,000 Btu per cubic foot. Therefore, a therm of natural gas usually is equal to about 100 cubic feet.

Total Tenant Payment: Generally 30 percent of a resident's adjusted income.

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

Unbundling: A term used to describe how consumers will be charged for electricity in a restructured utility environment. It is breaking up the current energy service package into separate components such as supply, transmission, and distribution.

Utility: Electricity, gas, propane, oil, water and sewer service, and garbage collection. Telephone service is not considered a utility for the purposes of this Website.

Utility Allowance: Per-apartment-unit allowance for resident-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 the utility costs of a reasonably conserving resident.

WAP: See Low-Income Weatherization Assistance Program

Wattage: A measure of the electric power required by a device such as a light bulb or appliance.

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

APPENDIX E: ACRONYMS

The following acronyms are applicable to the development of utility allowances (UAs) and have been used in this UA Guidebook.

ACRONYM	DEFINITION
A/C	Air Conditioning
AMP	Asset Management Project
ASHRAE	American Society of Heating Refrigeration and Air Conditioning Engineers
BR	Bedroom
BTU	British Thermal Unit
CCF	Hundred Cubic Feet
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
ECM	Energy Conservation Measures
ECMs	Energy Conservation Measures
EF	Energy Factor
EMS	Energy Management Systems
EPA	Environmental Protection Agency
EPC	Energy Performance Contracting
ESCO	Energy Services Company
ESP	Energy Service Providers
FEMP	Federal Energy Management Program
GPM	Gallons per minute
HCVP	Section 8 Housing Choice Voucher Program
HDD	Heating Degree Day
HERS	Home Energy Rating System
HQS	Housing Quality Standards
HUD	U.S. Department of Housing and Urban Development
HVAC	Heating, Ventilation, and Air Conditioning
IECC	International Energy Conservation Code
IRC	HUD's Information Resource Center
KWH	Kilowatt Hour
NOAA	National Oceanic and Atmospheric Administration
PHA	Public Housing Agency
PNA	Physical Needs Assessment
QC	Quality Control
RECS	Residential Energy Consumption Survey (U.S. DOE's)
TTP	Total Tenant Payment
UAs	Utility Allowances

APPENDIX F: ENERGYSTAR® PRODUCTS

Following is a partial list of ENERGYSTAR® products:

- Air-source heat pumps
- Appliances
- Boilers
- Ceiling fans
- Central A/C
- Clothes washers
- Compact fluorescent light bulbs
- Dehumidifiers
- Dishwashers
- Exit signs
- Furnaces
- Geothermal heat pumps
- Heating & cooling equipment
- Home sealing (insulation)
- Lighting
- Office equipment
- Programmable thermostats
- Refrigerators
- Room A/C
- Ventilating fans
- Windows, doors, & skylight

Note: ENERGYSTAR® also qualifies new homes to earn the ENERGYSTAR® certification label. (see www.energystar.gov/new homes)

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