

# PART ONE

## CHAPTER 1: PRIMER ON KEY UTILITY ALLOWANCE PRINCIPLES AND TERMS

This chapter provides a basic overview of some of the key principles underlying the establishment of utility allowances.<sup>1</sup> The chapter:

- explains where the concept of utility allowances for public housing residents comes from;
- identifies the types of utilities and utility uses for which an allowance may be granted;
- discusses some of the features that may be involved in determining whether a public housing resident is provided a utility allowance; and
- presents definitions of common technical terms associated with utility allowance calculations.

This chapter should be a good starting point for readers who have not previously had any experience with the technical aspects of utility allowances. All readers should review the definition of terms so that they will understand how these terms will be used in the remainder of this handbook.

### **The Basis for Utility Allowances in Public Housing**

Under the provisions of the U.S. Housing Act of 1937, as amended, HUD provides housing assistance to approximately 1.3 million households living in public housing across the country. This assistance is provided through approximately 3,100 Public Housing Agencies. HUD has responsibility for the oversight of federally assisted public housing and establishes regulations to guide these HAs in how they implement the federal housing assistance.

---

<sup>1</sup> In preparation of parts of this chapter, the authors relied heavily on the excellent overview of utility allowances provided in the U.S. General Accounting Office's March 1991 *Report to Congressional Committees: Assisted Housing—Utility Allowances Often Fall Short of Actual Utility Expenses*, GAO/RCED-91-40A.

---

In order to keep assisted housing affordable for lower-income households, federal housing law directs that the resident's share of rent in federally assisted public housing should equal 30 percent of the household's adjusted monthly income. In interpreting the federal housing law, HUD has defined the *Total Resident Payment* for "rent" to include both shelter costs *and the costs for reasonable amounts of utilities*. The amount that an HA determines is necessary to cover the resident's reasonable utility costs is the *utility allowance*.

Such allowances are *estimates* of the expenses associated with different types of utilities and different utility uses. The *utilities* for which allowances may be provided include electricity, natural gas, propane, fuel oil, wood or coal, and water and sewage service, as well as trash and garbage collection. The *functions*, or *end-uses*, covered by an allowance may include space heating, water heating, cooking, refrigeration, lighting, or appliances. Note that *allowances are not provided for telephone service*.

Utility allowances can be small or large, and at various HAs across the country, they range from less than \$10 to over \$200 for a resident household per month, depending on the number of utilities covered, their use, and the dwelling unit and/or household size.

#### **How Allowances Are Provided Depends on the Metering of the Utility**

Whether a household receives an allowance for a given utility service generally depends on the way the utilities are metered. Utilities can be metered in one of three ways: master-metered, checkmetered, and individually metered. Allowances are provided for checkmetered or individually metered utilities, but not for master-metered utilities.

**Master-Metered Utilities.** A master meter measures consumption for the building as a whole, rather than for individual dwelling units or households. Master meters are owned by the local utility company. Where utilities are master-metered, the HA pays the utility bills to the utility company. In such instances, the utility costs are included in the basic rent levels established by the HA, and no separate allowance is provided. (The HA, however, may establish a "surcharge"—an extra resident fee—for utility consumption for major appliances not seen as essential or consistent with local custom, such as a food freezer.)

**Checkmetered Utilities.** Some HAs install separate sub-meters (called "checkmeters"), in addition to the utility-owned master meter, to measure consumption by individual dwelling units. These checkmeters are owned by the HA. As with master-metered utilities,

the HA pays the utility bills to the utility company. With checkmetered utilities, however, the HA provides each household a utility allowance in the form of a maximum level of consumption that it may consume without a surcharge. When a household exceeds this level, a surcharge must be paid.

**Individually Metered Utilities.** Where utilities are individually metered, each household has a separate account with the utility company and pays the bill directly to that company. (For this reason, individually metered utilities are also called "resident-paid" or "resident-purchased" utilities.) The HA provides a utility allowance to the household, in the form of a reduction in the monthly amount for rent that the household must pay to the HA.<sup>2</sup>

Many buildings have different metering systems for different utilities ("mixed metering"). For example, electricity may be individually metered, gas may be master-metered, and water may be checkmetered.

An allowance may also be provided to residents for some non-metered utilities, because the residents pay for these services directly. Trash pickup and sewer services are examples of utilities that are non-metered in some areas.

For most utilities, individual meters are generally more prevalent than checkmeters in public housing. However, metering configuration varies widely by region. For example, in the Northwest section of the country, individual metering is more prevalent; in the South, however, checkmetering is very common.

The following are some estimates of metering configurations by type of utilities<sup>3</sup>:

**Electricity.** About 39 percent of public housing dwelling units are individually metered for electricity, whereas 17 percent are checkmetered. The other 44 percent have master-metered electricity.

**Natural Gas.** About 20 percent of public housing units are individually metered for natural gas, whereas 14 percent are

---

<sup>2</sup> It should also be noted that in some cases public housing residents with very low or zero rents actually receive a credited adjustment from the HA to pay utilities.

<sup>3</sup> These figures were derived from the HA questionnaire results in the GAO's 1991 *Report on Utility Allowances, Volume II*.

checkmetered. The remaining 66 percent have master-metered gas or do not have gas service at all.

**Water and Sewer.** About 8 percent of public housing dwelling units are individually metered for water and sewer, whereas 3 percent are checkmetered. About 89 percent of the units have master-metered water.

These figures allow an estimation of the numbers of public housing households that receive a utility allowance.

*According to the 1991 U.S. General Accounting Office report, 56 percent of public housing households receive an allowance for electricity, 34 percent receive an allowance for natural gas, 11 percent receive one for water and sewer, and 4 percent receive one for trash pickup. Fewer than 1 percent of public housing households receive an allowance for propane, fuel oil, water only or sewer only.<sup>4</sup>*

### **Allowances Are Calculated for Categories of Units**

Utility consumption tends to vary according to certain characteristics of units, such as building construction type and size. To account for such factors, HAs group dwelling units with similar characteristics into categories and calculate distinct allowances for each category. Each category (group) of dwelling units is called an *allowance category*.

### **How Allowances Are Calculated: HAs Can Choose Between Two Basic Methodologies**

The regulations governing calculation of utility allowances (discussed in detail in Chapter 2) specify the factors that HAs should consider in establishing allowance categories. It is left to the HA, however, to decide which methodology to use in establishing allowances, as long as the required factors and appropriate data sources are used.

There are two basic methodologies that can be used to develop reasonable allowances. HAs may establish allowances on the basis of either (1) engineering calculations or (2) consumption data. These two methodologies are described in Chapter 3. Chapter 4 provides assistance to HAs in determining which methodology may be most appropriate, given the particular HA's characteristics. Regardless of the methodology used to calculate the allowances, however, the HA must maintain a record

---

<sup>4</sup> These figures were derived from the HA questionnaire results in the GAO's 1991 *Report on Utility Allowances, Volume II*.

**Key Terms Used  
Throughout This  
Guidebook: A  
Glossary**

that documents the basis on which the allowances were established. This record must be made available to the residents.

There are a number of key terms commonly used in talking about utility allowances. The terms and their definitions, as used in this guidebook, are set out in the rest of this chapter. Words that appear in italics are defined elsewhere in this glossary.

**British Thermal Unit (Btu).** The amount of energy required to heat a pound of water 1 degree Fahrenheit (1°F). 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.)

**Calibration.** The process of checking or adjusting a measuring instrument, such as a checkmeter. Checkmeters 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.

**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 checkmeter 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 checkmeter readings that show how much energy or water was consumed within a given period of time.

**Cooling Degree Days.** Cooling degree days are 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°F and the daily *mean* (average) temperature when the latter is more than 65°F. Data on the 30-year average cooling degree days are provided in Appendix C of this guidebook.

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

**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.

**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 twelve equal monthly bills every year, even though utility use may go up or down with the seasons.

**Heat Loss.** The heat loss, or design heat loss, is 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.** Heating degree days are 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°F and the daily *mean* (average) temperature when the latter is less than 65°F. Data on the 30-year average heating degree days are provided in Appendix C of this guidebook.

**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.

**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*.

**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.

**Non-Allowable End-Use.** An *end-use* whose consumption is excluded from the utility allowance because the HA considers this use to be a luxury rather than a necessity. It is left to the discretion of individual HAs 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, an HA 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.

**Space Heating.** "Space heating" refers to 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 an HA charges a household, in addition to *Resident Rent*, for consumption of checkmetered 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 HA. Where all utilities are supplied by the HA, Resident Rent equals *Total Resident Payment*. Where some or all of the utilities are paid

directly by the resident to the utility company, then the Resident Rent equals Total Resident Payment minus the allowance for resident-purchased utilities.

**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 is usually equal to about 100 cubic feet.

**Total Resident Payment.** Generally 30 percent of a resident's adjusted income. (See Chapter 2 for a more complete discussion of Total Resident Payment.)

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

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

\* \* \* \* \*

Now that the reader has acquired some basic familiarity with the principles and technical terminology associated with utility allowances, the next chapter will examine in greater detail the specific federal requirements that HAs must meet in setting utility allowances for their residents.



## CHAPTER 2: THE FEDERAL REGULATIONS

### Overview

This chapter summarizes the federal regulations that govern the setting of utility allowances in public and Indian housing. These regulations, which are found at 24 CFR Part 965, apply to allowances for all applicable types of utilities, regardless of the methodology used to calculate the allowances.

The regulations do not require that any particular method be used to establish allowances. They do, however, contain guidelines regarding which utilities should be covered by allowances, the factors that must be considered in calculating allowances, and the period for which an allowance should be established (for example, monthly, bi-monthly, or quarterly).

In addition, the federal regulations require HAs to inform their residents of any changes being made in the allowance schedule, and of the availability of individual relief in case of special needs. Finally, the regulations require that HAs review their allowances annually to ensure that they continue to be consistent with the regulations.

### The Standard: "An Energy Conservative Household"

The regulations set forth the following basic standard for allowances for both HA-furnished and resident-purchased utilities. The objective of a HA in establishing allowances for each dwelling unit category and unit size must 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." [emphasis added].<sup>1</sup>

Because HUD does not specifically define "reasonable" or "energy conservative household," it is left to the HA to interpret these terms, in light of the HA's particular location and other characteristics. The following points should be kept in mind when considering the meaning of "reasonable" and "energy conservative household."

---

<sup>1</sup> 24 CFR 965.505(a).

- **"Energy-conservative household" refers to the consumption of a household, and not to factors outside the control of the residents, such as the physical condition of the public housing development or the energy efficiency of HA-provided appliances and equipment.**
- **The level of reasonable consumption may vary depending on differences in local custom and usage patterns.** For example, a HA in Georgia might consider ceiling fans part of reasonable energy usage, whereas a HA in Oregon might not.
- **The level of reasonable consumption may differ between two households that have identical dwelling units and appliances, depending on the occupants' lifestyles and schedules.** For example, a two-person household in which both residents are at work or school all day can be expected to have lower consumption than a two-person household that consists of a person who stays home all day to care for a live-in elderly parent. Both households may have reasonable energy consumption, even if the actual amounts of consumption differ, because of the differences in their lifestyles and needs.

### ***What Consumption is Within the Resident's Control?***

Any amount of consumption above the allowance ought to be reasonably within the control of the household to avoid. But what does it mean to be within the control of the household to avoid? For most end-uses, there are many factors that affect consumption. Usually, some of these factors can be controlled by the resident and others cannot.

For example, the consumption requirements for space heating depend on various factors, including climate, the efficiency of the heating system, the level of insulation in the dwelling unit, how the thermostat is used, and whether the resident opens the windows in the winter. In this example, only the last two factors are within the ability of the resident to control. And sometimes, a resident may feel compelled to open the window because of factors not within his or her control, such as overheating or poor ventilation in the apartment, in which case, the HA should examine the need for adjustment or maintenance of the heating system.

Therefore, it is important to keep in mind that consumption may be high due to factors that are beyond the control of the resident. Where energy or water consumption is high, the HA should take measures to improve energy and water efficiency of developments, as well as to provide energy and water conservation education to the residents.

### **What Allowances Should Include**

Utility allowances should be provided for reasonable consumption of checkmetered or individually metered utilities. Allowances for both HA-furnished<sup>2</sup> and resident-purchased utilities should be designed to reflect reasonable utility consumption for *major equipment or for utility functions furnished by the HA, essential equipment* whether or not furnished by the HA, and *minor items of equipment* furnished by the

---

<sup>2</sup> For HA-furnished utilities, the allowance sets the level of consumption above which a surcharge will be assessed against a resident household.

residents.<sup>3</sup> These categories of equipment can be broken down into the following end-uses:

- space heating
- domestic hot water
- cooking
- food refrigeration
- lighting
- appliances
- water and sewer
- trash/garbage disposal

*Where HAs provide an allowance for a "fixed price utility," it should cover the entire cost of that service.*

In addition, for Public Housing Agencies, allowances should include the entire cost of any "fixed price" (non-metered) utilities. Fixed price utilities are those utilities that cost the same amount, regardless of how much of the utility is used. For example, garbage collection services are usually a fixed price utility.

#### **Factors to Take into Account in Calculating Utility Allowances**

The regulations require that HAs "take into account relevant factors" when calculating utility allowances.<sup>4</sup> In addition to the types of equipment and functions to be covered by the allowance, these factors include:

- climatic conditions
- dwelling unit size
- number of occupants
- type of construction and design of the housing development
- energy efficiency of appliances and equipment
- physical condition of the development
- indoor temperature
- hot water temperature

What does it mean "to take into account" these factors? In essence, the HA must consider each factor separately and decide whether it would

---

<sup>3</sup> 24 CFR 965.505(b).

<sup>4</sup> 24 CFR 965.505(d).

***A note on appliances.*** All HA-supplied appliances should be covered by allowances. In addition, reasonable consumption due to resident-owned appliances that are considered necessities should be included in allowances. The HA should determine which appliances are necessities and which are luxuries. In making this determination, the HA must consider local custom and usage patterns. (Many appliances that were considered luxuries a decade or two ago may be considered necessities in today's world. For example, today many HAs consider television a necessity because this appliance provides necessary news and information.) If, after considering local custom and usage and local climate, the HA determines that the use of a certain appliance is a luxury, then this appliance may be termed a non-allowable end-use, and consumption attributable to that end-use is not covered by the allowance.

make a substantial difference in the allowance. If it would, then the HA should incorporate the factor into the calculation of the allowance. In some cases, incorporating a factor into the allowance calculation means making it a criterion for establishing *allowance categories* (see next section). Here is how these factors may be taken into account:

**Equipment and Functions to be Covered by the Allowance.** This factor involves determining which functions or end-uses are to be covered by an allowance. As noted above, the most common end-uses to consider are space heating, domestic hot water, cooking, lighting, food refrigeration, electrical appliances, water and sewer, and trash/garbage disposal. The energy usage can also depend on what kind of equipment is furnished for space heating, cooking, or heating water.

**Climatic Conditions.** Climatic conditions play a key role in the energy needs of a household. Local climate should be taken into account in determining if appliances used for cooling should be considered luxuries or necessities. The distinction between luxuries and necessities is used to determine whether these end-uses are considered non-allowable or allowable. With some methodologies (see Chapter 3), actual weather data are factored into the calculation of allowances.

**Dwelling Unit Size and Number of Occupants.** The utility needs of a household also depend on the dwelling unit size. Larger units

**A note on cooling.** It is important to note that air conditioning and cooling are not synonymous. Cooling refers to air conditioning as well as other end-uses used to improve comfort in the summer, such as dehumidifiers and fans.

Energy used for air conditioning is generally not included in utility allowances. Some limited exceptions are authorized by the regulations at 24 CFR 965.505(e):

- *For example, if an air conditioning system installed by a PHA does not give residents the option of choosing to use air conditioning, the residents are not to be charged. (Such systems are to be avoided whenever possible.)*
- *For air conditioning systems installed by the PHA that offer residents the option of choosing to use air conditioning and include retail meters or checkmeters, the residents must pay for such use and the PHA cannot include the air conditioning in its utility allowance.*
- *For air conditioning systems that provide for resident option but cannot be checkmetered, residents are to be surcharged per 24 CFR 965.506.*

require more energy to heat them. In addition, larger dwelling units tend to have more occupants.

The number of occupants in a household affects the consumption requirements of hot water and water/sewer services. To a lesser extent, the consumption requirements for lighting and appliances may also be affected by the number of people living in this unit. If an HA's allowances are set by dwelling unit size (number of bedrooms), separate consideration of the number of persons in the household may not be necessary except in the largest dwelling unit category. However, if there is significant variation in the number of legal occupants in dwelling units of the same size, then the number of authorized occupants in each dwelling unit should be considered in establishing allowances.

**Construction and Configuration of the Public Housing Development.** The construction and design of a housing development

are two of the primary factors for determining allowances. Two public housing developments of different construction and design have different overall utility needs, and therefore require different allowances. In addition, the construction and design of a development, or the location of a unit, may also produce variation in utility needs within a given building. For example, a top-floor corner apartment most likely has different heating needs than a first-floor apartment with only one exterior wall.

**Energy Efficiency of Appliances and Equipment.** The energy efficiency of HA-supplied appliances and equipment greatly affects the utility needs of a household. For example, because of energy efficiency improvements in equipment, a unit in a recently modernized building with a new heating system and newly-replaced appliances will have much lower utility requirements (all else being equal) than a unit with an 8-year old refrigerator in a building that has a 30-year old heating system.

**Physical Condition of the Development.** The utility needs of a household also depend on the physical condition of the development. For example, leaky faucets increase water use, and loose-fitting windows and lack of insulation increase heating requirements.

**Indoor Temperature.** The energy requirement for heating a dwelling unit depends on the standard established for indoor temperature in winter. (The indoor temperature is an input to calculate the energy required for space heating when using the engineering-based methodology, described in Chapter 5.)

**Hot Water Temperature.** The standard for the temperature of domestic hot water is a factor in the energy requirements of a household. It takes more energy to heat water to 130°F than to 115°F. (The hot water temperature is an input to calculate the energy required for hot water when using the engineering-based methodology, described in Chapter 5.)

### **Developing the Allowance Categories**

Because different types and sizes of dwelling units have different energy and water needs, the amount of utility consumption that could be considered to be reasonable varies among different dwelling units. *Allowance categories* are used to group together units with similar characteristics. Allowance categories are differentiated by factors that affect the reasonable consumption requirements of a household. In developing categories of allowances, the HA should take into account the factors outlined above. If a factor would make a significant difference on the allowance, it should be a criterion for an allowance category.

*At a minimum, categories of allowances should generally be differentiated by the following:*

**Equipment and Functions Covered by the Allowance.** Dwelling units that have different types of equipment and/or utility functions included in the allowance should be grouped in separate allowance categories. For example, one dwelling unit may have a gas stove, whereas a similar dwelling unit may have an electric stove. In such cases, the two dwelling units should be in separate allowance categories.

**Dwelling Unit Size and Number of Occupants.** Dwelling units of different sizes should be grouped in different allowance categories. Dwelling unit size is often expressed in terms of number of bedrooms. In some cases, the number of occupants may not need to be considered separately from dwelling unit size. In the largest size category of unit, however, separate consideration of number of occupants should occur. In addition, if there is significant variation in occupancy among dwelling units of the same size, then number of legal occupants should be considered in establishing allowances.

**Construction and Design of the Housing Development.** Dwelling units in developments of different construction and design should be grouped in separate allowance categories. For example, a high-rise development should be in a different allowance category than a townhouse-style development. Developments with exterior brick walls should be a different category than developments with wood siding.

It is also recommended that a dwelling unit's location within a building (for example, the number of exterior walls the unit has, or whether the unit is on the top or bottom floor) be a criterion in developing the allowance categories.

*In addition, the following factors should be assessed to determine whether any of them make a significant difference in energy usage and therefore need to be used as criteria in developing allowance categories:*

**Energy Efficiency of Appliances.** If the energy efficiency of HA-supplied appliances (such as refrigerators) and equipment (such as heating and hot water systems) varies significantly among developments of similar construction and design, then separate allowance categories should be developed for those different developments by appliance efficiency level.



**Physical Condition of the Development.** If the physical condition (for example, whether a development has been weatherized or modernized) varies significantly among developments of similar construction and design, then separate allowance categories should be developed for those developments.

**Indoor Temperature.** The indoor temperature of a dwelling unit should be a criterion in forming the allowance categories if two developments of similar construction and physical condition have different indoor temperatures, where an allowance is provided for space heating. For example, if one development that houses elderly people has an indoor temperature of 75°F, whereas a similar development that houses families has an indoor temperature of 72°F, then separate allowance categories are needed for the two developments.

***A note on allowance categories:*** The selection of allowance categories is one of the most critical steps in developing utility allowances, in terms of its effect both on the number of separate calculations that the HA will need to do, and on the fairness of the allowance.

*The total number of allowance categories that an HA will need to establish will vary depending on the number of developments, their comparative ages and utility configurations, the nature of the resident population, etc.*

*Within a development, an HA will most certainly want to have separate allowance categories for dwelling units of different sizes. For each development, the HA should also consider whether it is appropriate to have separate allowance categories by household size for the largest size category of units, or for under-housed or over-housed residents. The location of a unit within the building is an appropriate factor for differentiating allowance categories for space heating allowances.*

*In general, within a development, the utility configuration and equipment, construction materials/design, energy efficiency of equipment, indoor temperature, and physical condition should not vary greatly, and therefore these characteristics will not require separate allowance categories.*

**Period for Which Allowances Are Established**

According to the federal regulations, the period of time for which allowances are established depends on whether the utilities are checkmetered (HA-furnished) or individually metered (resident-paid).

**Checkmetered Utilities.** Where utilities are checkmetered, the HA may establish allowances on a quarterly or monthly basis. Residents may be surcharged on a monthly basis.<sup>5</sup> If a checkmetered utility's consumption is used for heating or cooling, the allowances should provide for seasonal variations. If an HA's allowances for season-sensitive utilities (i.e., space heating) do not themselves vary seasonally, then that HA should provide residents with credits for the

---

<sup>5</sup> 24 CFR 965.504(a).

months in which the level of utilities consumed is less than the uniform allowance.

**Individually Metered Utilities.** Where utilities are individually metered, allowances are generally established by the HA at a uniform monthly amount. If the utility company does not offer residents an "equal payments plan," however, the HA should consider providing for seasonal variations in its allowances.<sup>6</sup>

## **Individual Relief**

Because setting allowances involves estimation, HAs should expect that some residents who have excess consumption do not have the ability to control this consumption. The excess consumption may be caused by one of a number of factors. HUD regulations permit HAs to grant individual relief when the circumstances are beyond the resident's control. When granting individual relief, the regulations require HAs to develop criteria and notify the residents. The HA should consider the following as valid reasons when developing its criteria:<sup>7</sup>

- The resident's consumption was mistakenly portrayed as excessive due to defects in the meter or errors in the meter reading.
- The resident's excessive consumption is caused by a characteristic of the dwelling unit or HA-supplied equipment that is beyond the control of the resident. For example, the unit may have a particularly inefficient refrigerator or inadequate insulation. The allowance should be adjusted to reflect the higher consumption needs associated with the unit until the situation is remedied. The resident should be granted individual relief until the allowance is adjusted.
- The resident's excessive consumption is due to special needs of the resident and is not within his or her ability to control. For example, elderly, ill or handicapped residents may have special needs that justify higher energy or water consumption.<sup>8</sup> The allowance should be adjusted to reflect the higher consumption needs associated with the household's special circumstances.

---

<sup>6</sup> 24 CFR 965.504(b).

<sup>7</sup> 24 CFR 965.508.

<sup>8</sup> It should be noted that the state of being elderly, ill, or handicapped is not a sufficient condition for receiving individual relief. Rather, individual relief should be granted only under extraordinary circumstances.

If the resident's consumption is high because of a factor that is within the ability of the resident to control, then no relief should be granted.

The HA must inform its residents of the availability of individual relief, the procedures for seeking relief, and the HA's criteria for granting such relief. This information should be given to residents as part of the notice on proposed allowances and scheduled surcharges and revisions thereof. In addition, all new residents should be given this information when they move in.

If an HA surcharges a large percentage of its residents, it should consider analyzing the factors that are responsible for the high incidence of surcharging to determine if the excess consumption is within the control of most residents to avoid. If the high incidence of surcharging is due to factors that are not within the control of the residents, then the allowances should be recalculated. If the high incidence of surcharging is due to factors within the control of the resident, such as a large number of residents using non-allowable end-uses or engaging in wasteful consumption, then the allowances may be reasonable, but the HA should provide energy or water conservation education services to help the residents lower their consumption.<sup>9</sup>

#### Notice to Residents

The HA must maintain a record that documents the basis on which allowances and surcharges are established and revised. This record must be made available to residents.<sup>10</sup> In addition, the HA must give notice to all residents of *proposed* allowances and surcharges or *revisions* to allowances and surcharges at least 60 days before the allowances are scheduled to go into effect.<sup>11</sup>

#### *The notice to residents must include the following:*

- A description of the basis on which the allowances and surcharges were established or revised, including specification of which equipment and functions are included in the allowance.

---

<sup>9</sup> Information about effective programs for consumer energy education can be obtained through the Professional Association for Consumer Energy Education, P. O. Box 151147, Columbus, OH 43215-8147.

<sup>10</sup> 24 CFR 965.502(b).

<sup>11</sup> 24 CFR 965.502(c); however, according to 24 CFR 965.508(a) and 965.507(b), changes in allowances and the dollar amount of surcharges due to changes in the PHA's average utility rate are not subject to this advance notice requirement.

- Information on the availability of individual relief.
- Disclosure of where residents can find the records that document how the allowances and surcharges were calculated.
- Notification to the residents of their right to submit written comments on the allowances and surcharges. The period for submitting written comments must extend at least 30 days before the allowances or surcharges are to take effect.

*Although not required by the regulations, the notice should also include:*

- Information on the availability of special low-income or "lifeline" rates offered by the local utility company.
- Information on any "equal payments plan" offered by the local utility company.

#### **HUD Review of Allowances**

For federally assisted public housing, utility allowances do not have to be approved by HUD before they go into effect. However, HUD may review the allowances and surcharges in the course of audits or reviews of HA operations.<sup>12</sup>

#### **Annual HA Review of Allowances**

The federal regulations require that HAs review their utility allowances every year to determine whether the allowances need to be revised in order to remain consistent with the regulations.<sup>13</sup> The extent of the review process depends on the methodology that was used to calculate the allowances in the first place. (See Chapter 7 for more detail.)

Regardless of how the allowances were calculated, the general review process should include an examination of changes in utility rates. If the utility rates change by 10 percent or more, the HA must revise its allowances accordingly.<sup>14</sup> In addition, if the allowances were established based on engineering calculations or a fixed set of consumption data, the

---

<sup>12</sup> 24 CFR 965.502(d). The schedule of allowances and scheduled surcharges for IHAs also are not subject to approval by HUD before becoming effective, but are reviewed in the course of audits or reviews of IHA operations.

<sup>13</sup> 24 CFR 965.507(a).

<sup>14</sup> 24 CFR 965.507(b); in fact, the regulations at 24 CFR 965.507(b) indicates that a PHA may revise its allowances for resident-purchased utilities *between* annual revisions if there is a rate change of 10 percent or more.

---

review process should also include a review of whether major changes were made to the buildings, equipment, and appliances that would affect consumption requirements. If the allowances were calculated using a rolling base of consumption data, then the annual review process involves recalculating the allowances every year as an old year's data are dropped and the most recent year's data are added. *Chapter 7, Annual Review of Allowances*, provides further guidance on the review process.

**Question and  
Answer Exercise for  
Chapter 2**

**Questions**

1. Which of the following statements is *false*?
  - (a) Allowances should be set so that any amount above the allowance is within the ability of the resident to control.
  - (b) The establishment of utility allowances is a complex task.
  - (c) The reasonable consumption requirements of an energy conservative household are the same for all HAs.
  - (d) The level of reasonable consumption may differ between two households living in identical dwelling units, depending on the occupants' lifestyles and schedules.
  - (e) none of the above.
2. In which of the following situations should an allowance be provided?
  - (a) where utilities are checkmetered
  - (b) where utilities are individually metered
  - (c) where the resident pays for garbage pickup as a fixed-price utility
  - (d) a and b
  - (e) all of the above
3. Which of the following utilities is never covered by an allowance?
  - (a) natural gas
  - (b) electricity
  - (c) water
  - (d) telephone
  - (e) oil
4. Which of the following factors is *not* listed in the regulations as a required factor to take into account when establishing allowances?
  - (a) dwelling unit size
  - (b) consumption data from meter readings or utility bills of the dwelling units
  - (c) physical condition of the development
  - (d) energy efficiency of appliances and equipment
  - (e) none of the above
5. Which of the following items should the notice to residents include?
  - (a) a description of the basis on which the allowances were established and disclosure of where residents can see documentation of how the allowances were calculated
  - (b) information on the availability of individual relief for special needs
  - (c) information on low-income rates offered by the utility
  - (d) notification of residents' rights to submit comments on the allowances
  - (e) all of the above

**Question and  
Answer Exercise for  
Chapter 2**

**Answers**

1. (c) This statement is false. The reasonable consumption requirements of an energy conservative household are *not* the same for all HAs. Consumption requirements vary due to regional differences and other factors.
2. (e) All of the above. An allowance should be provided for checkmetered utilities, individually metered utilities, and for fixed-price utilities paid for by the residents.
3. (d) Telephone. Utility allowances do not include telephone services.
4. (b) Consumption data from meter readings or utility bills of the dwelling units. The regulations do not require HAs to take into account consumption data when calculating allowances. HAs may establish legitimate allowances based on engineering calculations, without using consumption data (this approach is discussed in Chapter 3). However, consumption data can provide valuable insight into actual energy and water usage in a development.
5. (e) All of the above. The notice to residents should include all of this information.



## CHAPTER 3: METHODOLOGIES TO ESTABLISH UTILITY ALLOWANCES

### Overview

HUD gives HAs wide latitude in how they develop utility allowances for their public housing units. Although the federal regulations state the various factors that should be taken into account (see Chapter 2 for a discussion of these factors), they do not require that any particular methodology be used to calculate allowances. Instead, it is left to the HA to decide which methodology to use in establishing allowances.

There are two basic ways to calculate allowances:

- (1) **Engineering-Based Methodology.** Allowances are based on engineering calculations, standardized consumption tables, and/or in-house information; or
- (2) **Consumption-Based Methodology.** Allowances are developed using actual consumption data from dwelling units in the HA's portfolio.

This chapter describes these two methodologies and discusses the advantages and disadvantages of each. The most appropriate methodology to choose depends on an HA's particular characteristics and resources. *Chapter 4, Choosing a Methodology*, provides guidance in determining which approach may be most suitable for a particular HA. Chapters 5 and 6 detail the process of establishing allowances based on engineering calculations or consumption data, respectively.

### Engineering-Based Methodology

With the engineering-based methodology, the HA uses engineering calculations and technical data to estimate reasonable energy and water consumption for a particular type of dwelling unit or household. The reasonableness of allowances set using the engineering-based methodology depends on assumptions made in the calculations. This guidebook provides help in developing the allowance categories and gives recommendations on these important assumptions.

The first step in establishing allowances with the engineering-based methodology is to develop allowance categories that group dwelling units according to factors that affect consumption requirements. Then, the consumption requirements for the various end-uses to be covered by the allowance—space heating, hot water, cooking, lighting, refrigeration,

## Applying the Engineering Methodology to Utility Functions and End-Uses

appliances, and/or water—are each determined separately. In some cases, not all of these end-uses are included in an allowance. For example, when a utility is master-metered, it is not included.

Depending on the end-use, the consumption requirement may be estimated based on engineering formulas, standardized consumption tables, or in-house information on equipment used or the physical condition of the developments. Below is a brief description of how the consumption requirements for various end-uses are commonly estimated under the engineering methodology. A more complete, step-by-step description of this method can be found in Chapter 5.

**Space Heating.** The energy requirement for space heating is estimated using an engineering calculation. One calculation is done for each *allowance category*. The following inputs are needed:

- the *heat loss* of a dwelling unit,
- the 30-year average *heating degree days* for the region,
- the *efficiency* of the heating system,
- the *Btus per fuel unit*,
- the *indoor temperature*, and
- the *outdoor design temperature* in winter.

The heat loss calculation for each unit category will be either already on file or can be performed by the local utility, a consultant, or an in-house engineer. Data on heating degree days and outdoor design temperature are provided in Appendix C of this guidebook. The efficiency of the heating system can be estimated based on the age and type of system.<sup>1</sup> Information on the Btus per fuel unit is provided in Chapter 5. Although there is no standard specified by the regulations, HAs frequently establish an indoor temperature of 72°F for family units and 75°F for elderly units.

**Hot Water.** The energy requirement for hot water is estimated using an engineering calculation. One calculation is done for each allowance category. The following inputs are needed:

---

<sup>1</sup> If the HA is in a region of more than 2,500 heating degree days, the heating system efficiency should be estimated by a licensed professional engineer.

---

- the *temperature of the cold water*,
- the *temperature of the hot water*,
- the *number of gallons per month* reasonably consumed by a household,
- the *efficiency* of the hot water heating system, and
- the *Btus per fuel unit*.

The temperature of the cold water can be estimated based on the geographical region, and using information provided in Chapter 5. The temperature of the hot water at the tap can be measured by maintenance staff. If the temperature at the tap is lower than the temperature in the hot water heater because of storage or distribution losses, this difference will be accounted for in an accurate estimate of the system efficiency. The number of gallons per month can be based on standard consumption levels, which are suggested in Chapter 5. The efficiency of the hot water heating system depends on the age and type of system. If the hot water heating system involves an extensive distribution system or a storage tank, estimating the system efficiency is a more complicated task because of storage and distribution heat losses and should be performed by a licensed professional engineer. Data on the Btus per fuel unit are provided in Chapter 5.

**Cooking.** The energy requirement for cooking is estimated using standard consumption levels. Chapter 5 provides recommended consumption amounts for cooking, by household size.

**Lighting.** The energy requirement for lighting is estimated by multiplying the wattage of each light bulb by the number of hours the average household would have the lights on. Chapter 5 provides typical ranges of consumption for lighting, by household size.

**Refrigeration.** The energy requirement for refrigeration is determined using in-house information on the annual energy consumption of the refrigerators provided in the dwelling units. Refrigerators manufactured during the last decade have labels that provide this information.

**Miscellaneous Appliances.** The energy requirement of miscellaneous appliances can be estimated using standard consumption tables available from the local utility. Chapter 5 provides typical ranges of consumption for appliances, by household size.

**Laundry.** Some HAs provide an allowance to cover the reasonable utility requirements of laundry. For example, the energy requirements of clothes washers are estimated based on the wattage

of the washer and how often it is used. Chapter 5 provides data on standard consumption levels for washers and dryers, by household size.

**Air Conditioning.** Some HAs provide an allowance to cover the reasonable utility requirements of air conditioning.<sup>2</sup> The energy requirement for air conditioning is determined based on the wattage of the air conditioner and how often it is used.

**Water.** A household's water consumption requirement depends on whether water-saving devices have been installed and is determined using standard consumption levels. Chapter 5 provides data on standard consumption levels for water, by household size.

Because the utility allowances derived from the engineering methodology are not linked to past patterns of resident consumption, an HA that switched to this method from the consumption-based methodology might experience a significant increase or decrease in the percentage of resident households whose actual consumption exceeds their allowance.

If an HA finds that a large percentage of its residents have consumption levels that exceed the allowance developed under the engineering-based methodology, the HA will want to re-examine its assumptions about consumption levels to make sure that they are not too strict and that any excess consumption is within the residents' control to avoid. As one approach to evaluating the reasonableness of the allowances, HAs can compare the allowances derived under the engineering method with those calculated under the consumption-based method. (This is fairly straightforward if the HA was previously using the consumption-based method).

If the re-examination suggests that the engineering-based allowances that were initially calculated are too low, the HA can go back and make adjustments in the assumptions used for calculating the individual utility/end-use consumption levels (such as in the number of loads of laundry per week, etc.) to provide more reasonable allowances for residents. Chapter 5 discusses this adjustment process in more detail.

---

<sup>2</sup> See regulations governing air conditioning at 24 CFR 965.505(e).

### **Advantages of the Engineering-Based Methodology**

- *The energy requirements of an "energy-conservative household" can be estimated using this methodology. By focusing on what consumption levels should be, this method promotes energy-conservative behavior.*
- *Allowances do not need to be recalculated every year.<sup>3</sup> Allowances should be recalculated periodically, however, to account for gradual changes in equipment and appliance use and efficiency. They should also be recalculated whenever major changes are made to the developments.*
- *The HA does not need to obtain actual consumption data for its residents to use this methodology.*

### **Disadvantages of the Engineering-Based Methodology**

- *HAs must have certain technical information available, such as heat loss calculations, efficiency of appliances and equipment, and weather data.*
- *HAs must make assumptions about what is reasonable consumption.*
- *The allowances are not linked to actual consumption and may be far off from actual consumption patterns.*

### **Consumption-Based Methodology**

With the consumption-based methodology, the HA uses actual utility data on past consumption by its residents to establish utility allowances. These data are in the form of billing records (where utilities are individually metered) or checkmeter records (where utilities are checkmetered). The first step in establishing allowances with the consumption-based methodology is to specify the allowable and non-allowable end-uses. The HA then needs to decide on the timeframe that its historic consumption data will span.

This guidebook will describe two different approaches that an HA can take in defining the timeframe of its consumption data:

---

<sup>3</sup> Allowances still must be *reviewed* annually to account for changes in utility rates, occupancy and other factors that may affect the allowance.

---

**Three-Year Rolling Base.** Many HAs use a three-year rolling base of data to calculate allowances. Every year, new consumption records are added to the database, and consumption records from the oldest year are removed. *With this approach, the HA must recalculate allowances every year.*

**Fixed Database, Normalized for Weather.** An alternative approach, which may be used when an allowance is provided for space heating,<sup>4</sup> is to use a fixed database of consumption information from one or more years, adjusted for the effects of weather using local weather information. *When this approach is taken, the HA does not need to obtain consumption data every year.*

Next, the HA needs to develop allowance categories that group dwelling units according to factors that affect consumption requirements.

Allowances are then established through the following process:

- collecting the consumption data
- grouping the data into allowance categories
- cleaning the data and checking the statistical validity of the data sets
- determining the "typical" consumption for each allowance category
- adjusting the data for any non-allowable end-uses (if such consumption has not already been removed from the data)
- converting consumption allowances to dollar allowances.

**Collecting the Consumption Data.** The first step in establishing allowances with the consumption-based methodology is to collect the consumption data. In the case of individually metered utilities, HAs obtain consumption records from the local utility. Generally, HAs must present a release form signed by the resident for each billing record. Where utilities are checkmetered, the consumption data are records of checkmeter readings that the HA makes on a routine basis. HAs that provide allowances for more than one utility (for example, electricity, gas, and water) must collect consumption data for each of those utilities.

---

<sup>4</sup> This approach should only be used if space heating represents a substantial portion of the utility consumption. This is generally the case, even when the utility is used for other end-uses, such as hot water heating and cooking. However, where the heating load does not represent a substantial portion of the consumption, such as may be the case in regions with extremely mild winters, then the weather-normalization approach should not be used.

---

**Grouping the Data into Allowance Categories.** Consumption data are then grouped according to the allowance categories developed by the HA. Each allowance category should have one data set.

**Cleaning the Data and Checking for Statistical Validity.** These are two distinct but related activities, which are both concerned with ensuring that the data set (i.e., the sample of consumption records) can provide a good approximation of the typical utility consumption experience of all units within the allowance category being studied. This is a critical step in the use of the consumption-based method.

To improve the quality of the consumption data being used for its calculations, an HA will generally want to "clean" the data by deleting dwelling unit utility records that are atypical or inaccurate because of vacancies, estimated readings that are not corrected for by subsequent actual meter readings, and/or non-allowable end-uses.

If the variation in the levels of consumption among units in an allowance category is high, however, a large sample size (i.e., data on a lot of the units in the allowance category) may be necessary in order to achieve statistical validity. If this is the case, then the HA may not have enough extra data available to be able to drop the units with vacancies or non-allowable end-uses, etc., entirely from its sample; instead, the HA may need to make adjustments in these data to allow their inclusion as part of the allowance calculations. Chapter 6 looks at this adjustment process in detail.

**Determining the Typical Consumption for Each Allowance Category.** Once statistical validity is confirmed, the HA determines the "typical" usage for each allowance category. The typical usage is determined by finding *the point of central tendency*. Both the mean and the median are points of central tendency. The mean and the median are discussed in Chapter 6.

The reasonableness of the calculation of typical consumption using the consumption-based methodology depends on the selection of proper allowance categories, the quality of the consumption data, and on whether the data set (the sample of consumption records for units) was statistically valid.

Even after an HA has derived an accurate estimate of a typical (whether mean or median) consumption level, however, the HA must still decide whether the standard for the "energy-conservative household" should be set at that level. For example, if the mean (average) is used as the standard, then in all probability a sizable percentage of resident households will have consumption above this level; the HA needs to ask

itself whether the "excess consumption" of these other households was actually wasteful and within the residents' ability to control. If the answer to either part of this question is "no," then the HA should consider establishing the allowances at some level above the mean (average) consumption figure. Chapter 6 provides guidance in how to go about this process.

#### **Advantages of the Consumption-Based Methodology**

- *This methodology is familiar to most HAs.*
- *For smaller HAs with a homogeneous housing stock and readily-available consumption data, this methodology may be simpler than the engineering-based methodology.*
- *The allowances have a direct link to actual consumption.*

#### **Disadvantages of the Consumption-Based Methodology**

- *This methodology does not provide insight into what proportion of usage may be attributed to wasteful consumption, so there is no guarantee that the average consumption for a given allowance category is representative of an "energy-conservative household."*
- *When the three-year rolling base approach is used, consumption data must be obtained every year and allowances must be recalculated annually.*
- *Where utilities are individually metered (resident-paid), obtaining the consumption data from the local utility can be a burdensome process.*



**Question & Answer**  
**Exercise for**  
**Chapter 3**

**Questions**

1. Which of the following is an acceptable basis for establishing allowances?
  - (a) a three-year rolling base of consumption data
  - (b) a fixed data base of consumption data, normalized for weather
  - (c) engineering calculations
  - (d) all of the above
2. When using the engineering-based methodology, which of the following is necessary to determine the energy consumption requirements for space heating?
  - (a) standard consumption tables
  - (b) utility billing records
  - (c) a heat loss calculation
  - (d) checkmeter readings
  - (e) all of the above
3. Which of the following statements about the engineering-based methodology is true?
  - (a) Allowances must be recalculated every year.
  - (b) Accurate consumption data must be obtained.
  - (c) Allowances have a direct link to actual consumption.
  - (d) The reasonableness of the allowances depends on the assumptions made in establishing the allowances.
  - (e) All of the above are true.
4. Which of the following should be done when using the consumption-based methodology?
  - (a) adjust the data for vacancy
  - (b) group the data into allowance categories
  - (c) determine the mean or median for each allowance category
  - (d) check the statistical validity of the data sets
  - (e) all of the above
5. **TRUE OR FALSE:** Three years of consumption data must be used when using the consumption-based methodology.

**Question & Answer  
Exercise for  
Chapter 3**

**Answers**

1. (d) All of the above. All of these alternative approaches are acceptable.
2. (c) Heat loss calculation. Standard consumption tables, billing records, and checkmeter readings are not necessary when calculating consumption requirements for space heating using the engineering-based methodology.
3. (d) The reasonableness of the allowances depends on the assumptions made in establishing the allowances.
4. (e) All of the above. Each of these steps should be included when using the consumption-based methodology.
5. *FALSE*. Three years of consumption data are required when the three-year rolling base approach is used; when the weather-normalization approach is used, however, as little as one year of data may be used (although data from more than one year is recommended).