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DIVISION

**The Utility Accounting Package User's Manual:
Version 1.0**

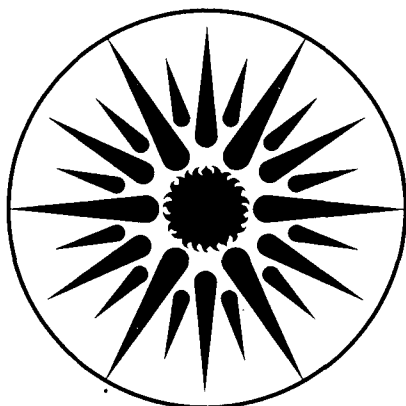
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LBL-26627

**THE UTILITY ACCOUNTING PACKAGE
USER'S MANUAL**

Version 1.0

**Prepared for the
U.S. Department of Housing and Urban Development
Office of Policy Development and Research
Innovative Technology and Special Projects Division**

**By the
Lawrence Berkeley Laboratory
Applied Science Division
Energy Analysis Program
One Cyclotron Road, B90H
Berkeley, California 94720**

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HUD Agreement IAA-H59-87
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December 1988

PREFACE

Utility costs are one of the largest expenses facing Public Housing Agencies (PHAs), amounting to over \$1 billion per year. While many PHAs have undertaken modernization projects to reduce their energy use, most are not able to control their energy use effectively.

The Utility Accounting Package (UAP) was developed by the Lawrence Berkeley Laboratory (LBL) with the joint sponsorship of the U.S. Department of Housing and Urban Development (HUD) and the U.S. Department of Energy (DOE) to provide an energy accounting system which can assist PHAs to continually assess and measure their current use of energy and level of energy expenditures. The UAP is also available to owners and managers of other multifamily properties (see Appendix F for details).

The UAP consists of computer software written for use in conjunction with Lotus 1-2-3 under the PC-DOS and MS-DOS operating systems on the IBM-PC, PC-XT, PC-AT, or fully compatible personal computers, together with this operating manual. Use of the UAP will permit a PHA to track its utility costs, identify areas where additional energy use reductions can be obtained, and increase its energy efficiency.

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ACKNOWLEDGEMENTS

The Utility Accounting Package was designed by Kathleen Greely, Evan Mills, Ronald Ritschard, and Sarita Bartlett; the principal investigator was Ronald Ritschard. The manual was written by Jeffrey Bass, with assistance from Kathleen Greely.

We wish to acknowledge the support and guidance provided by our two program managers: William Freeborne (HUD) and Jon Stone (DOE). Additional thanks are due to Joan Dewitt and Charles Ashmore of HUD Headquarters and William Henderson from the HUD Philadelphia Regional Office.

Finally, we wish to thank the following individuals who tested the early versions of the program and provided valuable information on how to make the system easier to use and more responsive: Andrew Sniderman, David Shields, and Lee Dailey of the Community Development Commission of Los Angeles; Linda Camblin, HUD Denver Regional Office; John Hardin, HUD Seattle Regional Office; Robert Palik, HUD Richmond Office, Michael Farris, HUD Atlanta Regional Office; Jeffrey Rose, HUD Milwaukee Office; and Belinda McGlone, HUD Philadelphia Regional Office.

Disclaimer

The information in this publication reflects the current state-of-the-art in energy analysis. While the Lawrence Berkeley Laboratory, the Department of Housing and Urban Development, and the Department of Energy have carefully reviewed the documentation in this publication and the computer software it describes, none of these organizations is able to make any warranty, either express or implied, for the performance of the software or the accuracy of the documentation, nor to accept any liability resulting from their use.

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INTRODUCTION

What is the Utility Accounting Package?

The Utility Accounting Package (UAP) allows public housing agencies (PHAs) easily and accurately to track the consumption of all utilities (electricity, gas, oil, and other fuels, plus water and sewer) within housing projects. The software helps PHAs identify projects with high utility consumption, and thus allows targeting of those projects most in need of retrofit.

The user enters monthly utility usage and costs into a pre-defined Lotus 1-2-3® worksheet. The software then:

- Adjusts utility usage and costs to calendar months, and converts energy consumption to common units
- Weather-corrects energy usage to that which would have occurred in a year with "average" weather
- Compares each year's consumption and costs to previous years'
- Compares the consumption per unit-month to that in a typical PHA or a privately owned apartment with similar climate and building characteristics
- Provides an executive summary and other tables and graphs to aid in tracking utility usage and costs
- Combines utility data for all projects within a PHA for aggregate analysis
- Calculates the Allowable Utilities Expense Levels (AUEL) for a three-year rolling base
- Prepares HUD forms 52722A and B for the Performance Funding System

System Requirements

To use the Utility Accounting Package, your personal computer system must include:

- An IBM® or IBM-compatible personal computer with at least 512K of memory, running MS DOS 3.2® or higher
- A hard disk drive and a floppy disk drive, or two floppy disk drives
- Lotus 1-2-3 (version 2.0 or higher)
- A printer supported by Lotus 1-2-3

Essential Knowledge for All Users

Before using the Utility Accounting Package, be sure to familiarize yourself with the contents of this manual. In addition, you should have a basic understanding of Lotus 1-2-3. Lotus 1-2-3 has built-in tutorials and an extensive on-line help facility to assist new users.

How to Use this Manual

The Utility Accounting Package is not difficult to use, but you must first learn *how* to use it. Whether you are a novice or a seasoned 1-2-3 user, this manual is arranged to meet your needs quickly and completely.

The manual can be read in three ways:

- As a tutorial for the data entry operator (Chapters One and Two);
- As a guide for the energy analyst (Chapters One and Three);
- As a reference for experienced users (Chapters One, Two, and Three).

In any event, *all* users should familiarize themselves with the contents of the manual before beginning to work with the software in earnest.

Here's a brief summary of how the manual is arranged:

Chapter One, **Getting Started**, familiarizes you with the Utility Accounting Package and how it works. You'll learn how to make working copies of the master disks and how to manage your worksheet files. The chapter also describes the types of PHAs for which this program is optimally intended.

Chapter Two, **The Data Entry Worksheet**, explains how to create individual project files with the Master Data Entry Worksheet and how to enter project data. You will learn how to enter a project description, how to enter the utility types and billing units, and how to enter the monthly utility consumption and costs for an seven-year period.

Chapter Three, **The Energy Analysis Worksheet**, explains how to read project files into the Energy Analysis Worksheet, how to obtain and use weather data to "weather-correct" monthly consumption, and how to generate and use various tables and graphs to analyze your PHA's utility usage and costs. The production of the Performance Funding System forms 52722A and B is also explained here.

Appendix A, **"ALT" Command Quick Reference**, lists all "ALT" keystroke combinations in the UAP. The various "ALT" commands process and save sections of the worksheets. Photocopy or remove this quick reference section for easy access.

Appendix B, **Worksheet Menus**, provides flowcharts of the Data Entry and Energy Analysis Worksheets' main menus and submenus.

Appendix C, **How to Obtain Weather Information**, explains where to go for heating degree-day information.

Appendix D, **Performance Funding System Instructions**, contains HUD instructional material for completion of Performance Funding System forms 52722A and B.

Appendix E, **Sample Graphs and Tables**, contains samples of all graphs and tables you can produce using the UAP.

Appendix F, **User Support**, contains information about how to get your questions and comments about the UAP addressed, how to obtain additional copies of the program, and how to register to receive future updates of the UAP.

Appendix G, **Glossary**, contains definitions of frequently used terms.

Notes and **Warnings** appear throughout the manual. Notes contain useful hints, cross references, and other information relevant to the topic at hand. Warnings alert you to potential problems and suggest ways to avoid them.

Typographical Conventions

Throughout this manual, the names of keys on your computer keyboard appear in capital letters (e.g., ALT, RETURN, and ESC). Worksheet filenames and disk drive pathnames also appear in capital letters (e.g., C:\LOTUS\UTILITY\MYFILE0.WK1). UAP and 1-2-3 menu options appear with the first letter in bold-face type (e.g., **S**ave). Lotus 1-2-3 commands appear preceded by a slash (/), just as you should type them.

CHAPTER 1 GETTING STARTED

Making Working Copies

In order to protect your original Utility Accounting Package master disks, immediately make working copies of them. Copy the two master disks onto your hard disk or onto two blank, formatted floppy disks, depending on your system configuration. Always use these copies as your working copies. Keep the master disks in a safe place and *never* use them. This way, should anything ever happen to your working copies, you will always have the original versions as backups. (See your MS-DOS manual for instructions on how to copy disks.)

How the Utility Accounting Package Works

The Utility Accounting Package consists of two pre-defined 1-2-3 worksheet files. The worksheets were created using 1-2-3 macros. (Macros are combinations of 1-2-3 commands.) For the user, the worksheets serve as templates that make data entry and analysis simply a matter of following a form. Custom menus replace the standard 1-2-3 menus, and each menu option moves you to a specific place on the worksheet--for instance, to a data entry area, or to an area that displays graphs and tables.

Note: The worksheets are pre-defined throughout, and have been write-protected within 1-2-3. There is no need to use the standard 1-2-3 menus to operate the Utility Accounting worksheets.

Warning: Do not try to override the write-protection, nor try to alter any of the macros in the worksheets. If you attempt to make a change in a write-protected area, you will get an error message stating that the cell is protected (press ESC to clear the error message from the screen, then ALT B to get the main menu back). *DO NOT DELETE ANY RANGE NAMES!* If you do, the program will crash.

For Advanced Users: If you are an advanced 1-2-3 user who comes to feel that you must make some change to the macros, be absolutely certain that you have your unaltered UAP master copies available in case of an unexpected catastrophe. See the files DEWDOC.WK1 and EAWDOC.WK1 provided on the master disks for reference documentation.

File Descriptions

The files MSTR_DEW.WK1 (on disk 1) and MSTR_EAW.WK1 (on disk 2) are the Utility Accounting Package master worksheet files. The first is the Master Data Entry Worksheet (DEW), which is the file you retrieve when you want to create a new project file to store utility data. The second is the Master Energy Analysis Worksheet (EAW), which is the file you retrieve when you want to print or display specialized graphs and tables. Reference documentation is also included on the master disks, in the files DEWDOC.WK1 and EAWDOC.WK1; these files are *not* needed to use the UAP and are included only for the interests of the advanced user. Flowcharts of the DEW and EAW main menus and submenus are contained in Appendix B.

The DEW allows you to create **project files** for each housing project that you want to monitor; project files will correspond to projects, buildings, or individual apartments, depending on how your PHA is metered (see "Optimal Uses" below). The project files you create are really just copies of the Master Data Entry Worksheet with the "blanks" filled in. Project files consist of a project description, the types of fuels used, fuel and water billing units, the monthly utility records, and the associated calendar-adjusted utility data. Once created, project files may be retrieved back into 1-2-3 for updating as often as you like. The Data Entry Worksheet is fully explained in Chapter Two.

The EAW allows you to analyze the data entered in the project files. This worksheet lets you produce graphs and tables for individual projects, and lets you combine project files to produce summary graphs and reports. The Energy Analysis Worksheet is fully explained in Chapter Three.

File Management

If your computer system has two floppy disk drives but no hard disk, keep the master worksheet files in drive A and your UAP files (DEWs and EAWs) in drive B. (You'll have to remove the 1-2-3 disk from drive A after the program loads; see "Loading the Master Data Entry Worksheet" in Chapter 2.) One DEW or EAW will fit on one double-sided double- (low-) density floppy disk. If you use high-density disks, four DEWs will fit on each disk.

Note: The UAP Master disks are double- (or low-) density disks, which can be read by low- or high-density 5¼" disk drives.

If your computer system has a hard disk, keep the two master worksheet files and all project files on the hard disk. It is recommended that you create a subdirectory containing the master worksheets and project files within your 1-2-3 subdirectory. By creating a subdirectory solely for your UAP files, you'll minimize the chances of misplacing files or confusing UAP project files with other data on the disk.

Both the DEW and EAW allow you to specify whether you want to save files on a hard disk or on floppies.

Optimal Uses

The Utility Accounting Package was designed to track the usage of all utilities within *master-metered* housing projects. The software will work best for small- to medium-sized PHAs (with 100 projects or less). File manipulation is fastest and easiest if your system has a hard disk; systems that use high-density disks will work more quickly than those that use double-density disks (because more DEWs will fit on a disk).

Each DEW project file can accommodate one meter (or billing account number) *per* utility. If most utilities at a project are master-metered, but one is not (say, electricity), use the DEW for the master-metered utilities *only*.

The Utility Accounting Package can in principle be used for individually metered apartments, but this will require a separate worksheet for each meter. In a large project, the number of worksheets thus generated will quickly become cumbersome (since this will result in one meter per each double-density floppy). Further, since each worksheet occupies approximately 300K on disk, constraints of disk space would also soon become an issue.

CHAPTER 2 THE DATA ENTRY WORKSHEET

Loading the Master Data Entry Worksheet (DEW)

The Master Data Entry Worksheet (DEW) is not a stand-alone program; it requires Lotus 1-2-3. To run 1-2-3 and load the Master Data Entry Worksheet, follow these steps:

1. Turn on your computer and, if you intend to use it, your printer.
2. Run 1-2-3 as you normally do. (If you don't know how to run 1-2-3, consult your 1-2-3 manual or specialist at your site.)

Note: If your computer system has two floppy disk drives but no hard disk, remove the 1-2-3 disk from drive A once the program loads. Now place the MSTR_DEW.WK1 disk in drive A. Keep a blank formatted disk in drive B for storing project files.

3. Once you are in 1-2-3, retrieve your working copy of the Master Data Entry Worksheet file MSTR_DEW.WK1. To retrieve the file, use the standard 1-2-3 /File Retrieve (/fr) command.

The program asks you to WAIT as it retrieves the Master Data Entry Worksheet. (File retrieval takes about a minute on an IBM-AT®, or compatible, computer, but can take up to three minutes on an IBM-XT®, or compatible.) Soon the READY prompt appears, and you will see the screen shown in Figure 1.

Warning: The DEW requires all available memory on a 512K machine. If you have programs that automatically load at boot time (e.g., an opening menu, a mouse driver, etc.), the DEW may not fit. In that case, you will get a "memory full" message at the bottom of the screen. Deactivate those auto-boot programs and repeat the steps above.

Before You Begin

Keystrokes and Data Entry: Just as with the standard 1-2-3 menus, use RETURN (or ENTER) to invoke the highlighted menu option. Use the SPACE BAR to move the cursor from one menu option to another, use the arrow keys, or simply type the first letter of the option. (To simplify instructions, this manual refers only to using the SPACE BAR when selecting a menu option.) Use the arrow keys to move around the worksheet.

Only those cells that are highlighted on screen are for data entry. If you try to type over a protected (unhighlighted) cell, you'll get an error; if you get such an error, press ESC to continue, then press the ALT and B keys *simultaneously* to redisplay the main menu. You do not need to enter data in *all* highlighted areas; some cells are highlighted because the program writes information to them. See the instructions for each menu option for the exact areas for data entry.

Note: It may be that your display screen is unable to highlight characters. In that case, follow the instructions in this manual and see the photographs of screens for proper areas of data entry in the worksheet.

When entering large numbers, do not use commas--the program will insert them for you. Likewise with dollar amounts: do not enter commas nor dollar signs--the program will

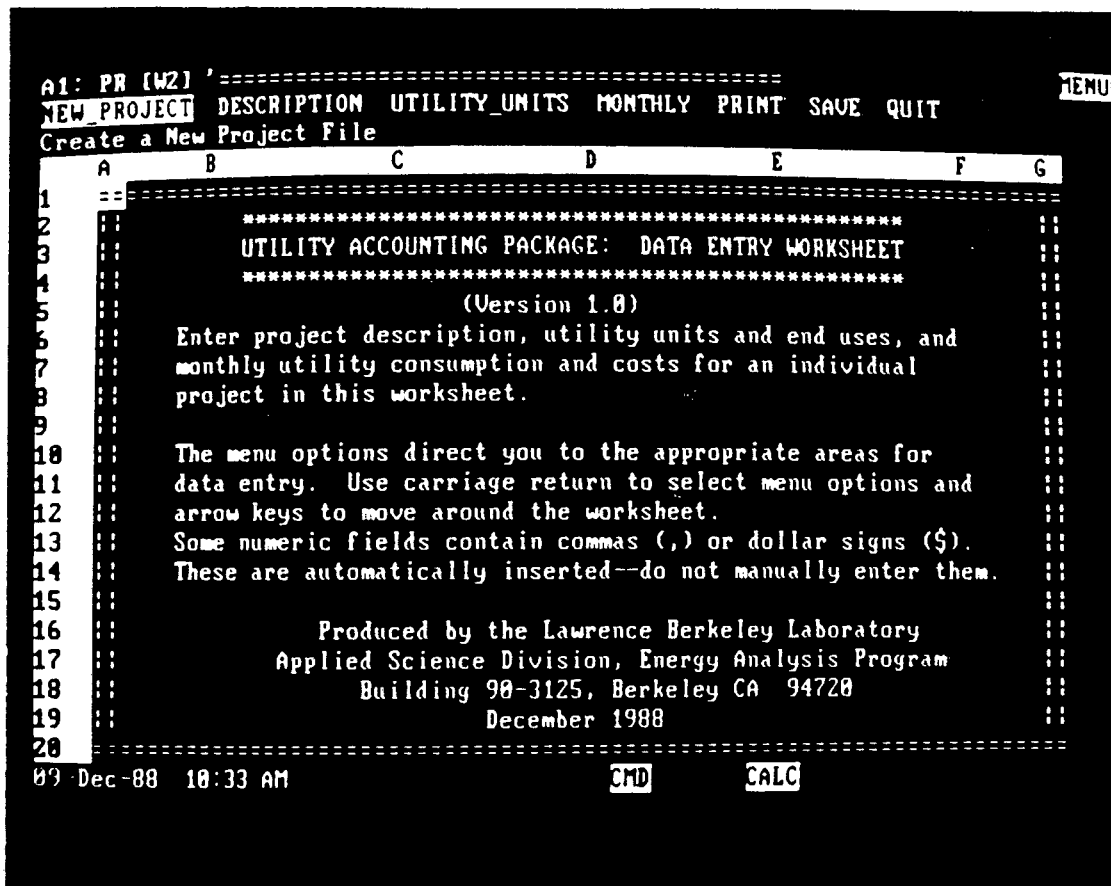


Figure 1. Opening screen of Data Entry Worksheet. Main menu options appear at top of screen.

supply them. If you mistakenly enter a comma or dollar sign, the program will give you an error (press ESC to clear the error message).

When entering alphabetic characters (labels), simply type the entry; the program will automatically supply the 1-2-3 prefix to left-adjust the entry.

The menu at the top of the screen will disappear after you select a menu option (the program at this point is ready to accept the data you enter). Press the ALT key and the D key *simultaneously* to save the data you enter and cause the menu to reappear. Press the ALT key and the B key *simultaneously* to make the menu reappear *without* saving.

Once data entry is complete in any given worksheet area, press the ALT and D keys *simultaneously* to save your work.

Don't Mind the Formulas: You will notice that many of the cells in the spreadsheet contain formulas (e.g., $+(a1*b2)/c3$). These cells are protected; if you try to enter data in these cells, you will get an error. Restrict your data entry to the highlighted areas of the worksheet. Similarly, never delete or insert rows or use the 1-2-3 Move command to rearrange data in the master worksheets. If you need to move data (for example, data

entered in the wrong place in the worksheet), use the 1-2-3 Copy then Range Erase commands. Do *not* use the 1-2-3 Move command; if you do, the formulas will be damaged.

Recalculation of Formulas: The formulas are not automatically recalculated as you make data changes (the recalculation has been set to manual). Instead, the recalculation is done when necessary (in order to speed up worksheet performance), such as when you save and before printing a table or graph. However, if you desire to recalculate the worksheet, you can do so by typing the F9 key at any time (provided the menu is not currently displayed).

What's in a Name?: Project filenames may consist of eight (or fewer) alphanumeric characters, plus the mandatory 1-2-3 .WK1 extension. The program will automatically append the extension for you; you do not have to type it.

For reasons that will become clear later, it is recommended that project filenames consist of seven (or fewer) alphabetic characters and a number (e.g., MYDEW0.WK1). The number in the name will allow you to track multiple files associated with a single project. (Each DEW holds up to seven years of data; after the initial seven years of data are entered, a new DEW will have to be created using the Archive menu option.) It is also recommended that the *initial* file you create for a given project be named using a zero (0). For more information, see "Archiving a Project File" later in this Chapter.

Note: Please be aware that all costs reported and analyzed by the UAP are in nominal dollars only; they are not adjusted for inflation.

New_Project

The New_Project option allows you to create a new housing project file.

Creating A New Project File

To create a new project file, follow these steps:

1. With the cursor highlighting New_Project, press RETURN.
2. At the top of the screen, the program prompts you for a path and filename. Type the path (disk directory plus any subdirectories) and filename you want to use for the new project (e.g., C:\LOTUS\UTILITY\MYDEW0.WK1 for a hard disk, or B:\MYDEW0.WK1 for a floppy). (This should be a *new* name; using the name of a file which already exists will cause an error.)
3. Now press RETURN. The program asks you to WAIT as it creates the new project worksheet.

When the READY indicator appears, the worksheet currently displayed is the one you've just named (e.g., MYDEW0.WK1). The Master DEW remains on disk unaltered.

Note: Remember that if you have a system with two floppy disk drives but no hard disk, it is recommended that you keep project files on drive B.

Warning: The subdirectories you specify must already exist on your hard disk. If you specify subdirectories that don't exist, you will get an error. When saving to floppies, if you don't have a disk in the drive you've specified, you'll get the "Disk Drive Not Ready" error message. Press ESC then ALT B to restore the menu, and insert a disk and try again. Similarly, if you try to save to a floppy that

doesn't have enough storage space remaining, you'll also get an error message. Press ESC then ALT B to restore the menu, and insert a new disk and try again.

Description

The **Description** option allows you to enter the project description.

Before You Begin

Before you begin to enter a project description, you should have the following information about the project at hand:

- Your public housing agency name
- The housing project name
- The tenant type (family, senior, or mixed)
- The average number of stories per building in the project
- The total number of apartments in the project
- The total number of buildings in the project
- The conditioned floor area, i.e. areas with space heating and/or cooling (in square feet)
- The year the project was constructed
- The number of apartments with 0 (studio), 1, 2, 3, 4, and 5 or more bedrooms

Entering a Project Description

Use the SPACE BAR to highlight the **Description** option, then press RETURN. You will see the screen shown in Figure 2.

This is the project description screen. You are to fill in the highlighted cells with the requested information. Placelholding information has been supplied in these cells. Move the cursor over the supplied information and type in your PHA information.

- *Public Housing Agency*
Enter your public housing agency name.
- *Project Name*
Enter the current project name.
- *Tenant Type*
Enter the type of housing project (senior, family, or mixed).
- *Average Number of Stories per Building*
Enter the *average* number of stories per building. For example, if there is one two-story building and one four-story building on the same meter, enter 3 here. If there is only one building in the project, enter the number of stories in the building.
- *Total Number of Apartments*
Enter the total number of dwelling units.

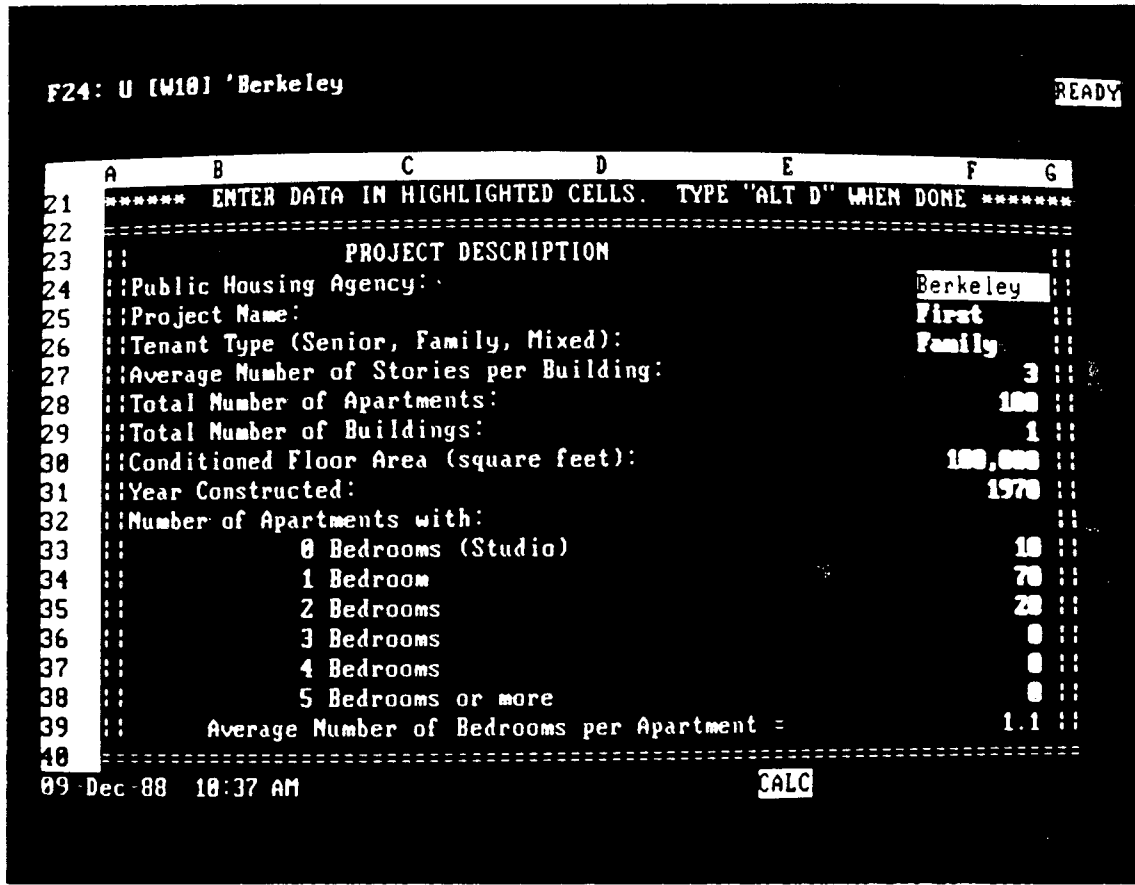


Figure 2. Description option of Data Entry Worksheet. Areas for data entry are highlighted. Sample data for a fictitious project are shown here; your MSTR_DEW will look different, since it contains placeholders (names, zeros, or blanks) rather than sample data.

- **Total Number of Buildings**
Enter the total number of buildings.
- **Conditioned Floor Area**
Enter the total square footage of conditioned floor area. Conditioned floor area is defined as all rooms heated and/or cooled. In some instances, vestibules, corridors, and parking areas are not heated or cooled, and are thus excluded. If you do not have specific information on the conditioned floor area, enter the total floor area.
- **Year Constructed**
Enter the year the building(s) was constructed.

- *Number of Apartments with*

Enter the number of dwelling units with 0 (studio), 1, 2, 3, 4, and 5 or more bedrooms.

- *Average Number of Bedrooms per Apartment*

Do not try to alter this cell. The program automatically calculates this for you when you save the worksheet (or, if the menu is not currently displayed, you may press F9 to recalculate).

Saving the Project Description

It's time to save this section of the worksheet. Press the ALT and D keys *simultaneously*. The program asks you to WAIT for a moment as it saves the information you've just entered. When the READY prompt appears, the cursor returns to the menu.

Utility_Units

The Utility_Units option allows you to enter the project's utility types and billing units.

About Utility Units and Conversions

Your utility bills may be prepared using many possible units for the project's consumption. Gas may be in therms or hundreds of cubic feet (ccf); oil may be gallons #2, #4, or #6 (each with a slightly different energy content per gallon); water may come in hundreds of cubic feet (ccf), gallons, or even millions of gallons (M gallons). To simplify the job of tallying up total energy use and comparing the use among fuels, the worksheet automatically converts all original data to common units. For energy the common unit is millions of Btus (MBtus); for water it is millions of gallons (M gallons). For electricity *demand* (not usage), the unit is kW.

The program automatically converts the energy data when it is entered--you need not perform the conversions. The raw consumption figures do not change on screen, however; the conversion is done in a lower section of the worksheet, i.e., the Adjusted Billing section. For your information, the conversions are as follows:

Gas:	ccf x 0.102 = MBtu therms x 0.1 = MBtu
Oil:	gallons #2 x 0.139 = MBtu gallons #4 x 0.145 = MBtu gallons #6 x 0.150 = MBtu
Electricity:	kWh x 0.003413 = MBtu (site energy)
Water:	ccf x 0.00075 = M gallons gallons x 0.000001 = M gallons

Before You Begin

Before you begin to enter the utility units, you should have the following information about the project at hand:

- For oil: (1) the billing account number; and (2) the unit of consumption (gallons #2, #4, or #6).
- For electricity: (1) Either the billing account number or meter number; and (2) determine whether the project is billed by usage (kWh) and demand (kW) or by usage only.
- For gas: (1) Either the billing account number or meter number; and (2) determine whether the project is billed in hundreds of cubic feet (ccf) or in therms.
- For other fuels (e.g., a secondary oil, solar, coal, propane, or steam): (1) Either the billing account number or meter number; (2) determine the billing units; and (3) if the billing unit is other than one of units listed as unit options in the worksheet, then determine the conversion factor (*from* the utility units to MBtu).
- For water: (1) Either the billing account number or meter number; and (2) determine whether the project is billed in gallons, millions of gallons (M gallons), or hundreds of cubic feet (ccf).

Note: The billing account number or meter number will allow you to track the utility bills you enter in a given project worksheet, i.e., they serve as control numbers. The Utility Accounting Package does not use them for any other purpose.

You must also have ready the primary and secondary (if applicable) types of fuels the project uses for the following end uses:

- Space Heat
- Hot Water
- Cooking

Entering the Utility_Units

Use the SPACE BAR to highlight the Utility_Units option, then press RETURN. You will see the screen shown in Figure 3.

The cursor highlights the first data entry cell, the billing account number for oil. Use the arrow keys to move around the worksheet as you enter data.

• *Oil*

Enter the billing account number and unit type. The unit options for oil are: **gallons #2**, **gallons #4**, or **gallons #6**. The units must be entered just as you see them here.

Note: The program can explicitly accommodate only one type of oil. Enter the predominate oil type in this cell, and the secondary oil type (if applicable) as "other" (see below). More than two oil types per project cannot be accommodated.

C47: (F0) U [W16] 9876 READY

A	B	C	D	E	F	G
41	***** ENTER DATA IN HIGHLIGHTED CELLS. TYPE "ALT D" WHEN DONE *****					
42	-----					
43	Berkeley	FUEL AND WATER UNITS & END USES			06-Dec-88	
44	First					
45		ACCOUNT/METER			CONVERSION	
46	UTILITY	NUMBER	UNITS	FACTORS		
47	Oil	9876	gallons #6	0.150000		
48	Gas	5432	ccf	0.102000		
49	Elec. Usage	1234	kWh	0.003413		
50	Elec. Demand	1234	kW	1.000000		
51	Other	9875	gallons #2	0.135000		
52	Water	54678	gallons	0.000001		
53	(Options for Units: Oil--gallons #2, gallons #4, or gallons #6:					
54	Gas--ccf, therms; Water--gallons, M gallons, ccf.)					
55						
56	END USES	PRIMARY FUEL	SECONDARY FUEL			
57	Space Heat	gas	none	(For fuel type, enter oil,		
58	Hot Water	oil	gas	gas, electric, other,		
59	Cooking	gas	none	or none.)		
60	-----					
09-Dec-88 10:38 AM						CALC

Figure 3. Utility_Units option of the Data Entry Worksheet. Areas for data entry are highlighted. Sample data for a fictitious project are shown here; your MSTR_DEW will look different, since it contains placeholders (names, zeros, or blanks) rather than sample data.

- **Gas**

Enter the billing account number or meter number and unit type. The unit options for gas are **therms** or **ccf**. The units must be entered just as you see them here.

- **Electricity Usage**

Enter the billing account number or meter number. The unit type for electricity usage is **kWh**, which cannot be changed.

- **Electricity Demand**

Enter the billing account number or meter number. The unit type for electricity demand is **kW**, which cannot be changed.

- *Other*

Enter the fuel type (you may type over "other," which serves only as a placeholder), billing account number or meter number, and unit type. If the billing unit is *different* than one of units listed as unit options in the worksheet (i.e., other than gallons #2, #4, or #6, therms, ccf, or kWh), then enter the conversion factor (*from* the utility units to MBtu). Use the right arrow key to move to the conversion factor cell.

- *Water*

Enter the billing account number or meter number and unit type. The unit options for water are: **gallons**, **M gallons**, and **ccf**. The units must be entered just as you see them here.

Entering the End Uses

Use the arrow keys to move down to the End Uses section of the worksheet. The **primary fuel** is defined as that fuel used predominately for a given end use. The **secondary fuel** is defined as that fuel used in addition to, but not exceeding, the primary fuel for a given end use.

- *Space Heat*

Enter the primary and secondary fuels for space heat. If there is no secondary fuel, type "none."

- *Hot Water*

Enter the primary and secondary fuels used for domestic hot water. If there is no secondary fuel, type "none."

- *Cooking*

Enter the primary and secondary fuels for cooking. If there is no secondary fuel, type "none."

Saving the Utility_Units

It's time to save this section of the worksheet. Press the ALT and D keys *simultaneously*. The program asks you to WAIT for a moment as it saves the information you've just entered. When the READY prompt appears, the cursor returns to the menu.

Monthly

The **Monthly** option allows you to enter the project's utility consumption and costs.

Use the SPACE BAR to highlight the **Monthly** option, then press RETURN. The menu changes to the **Monthly** submenu, which consists of the following options: **Generate**, **Copy_Dates**, **Billing_Data**, **Archive**, and **Menu**. You will see the screen shown in Figure 4.

Before You Begin

Before you begin to enter the monthly data, you should have the following information about the project at hand:

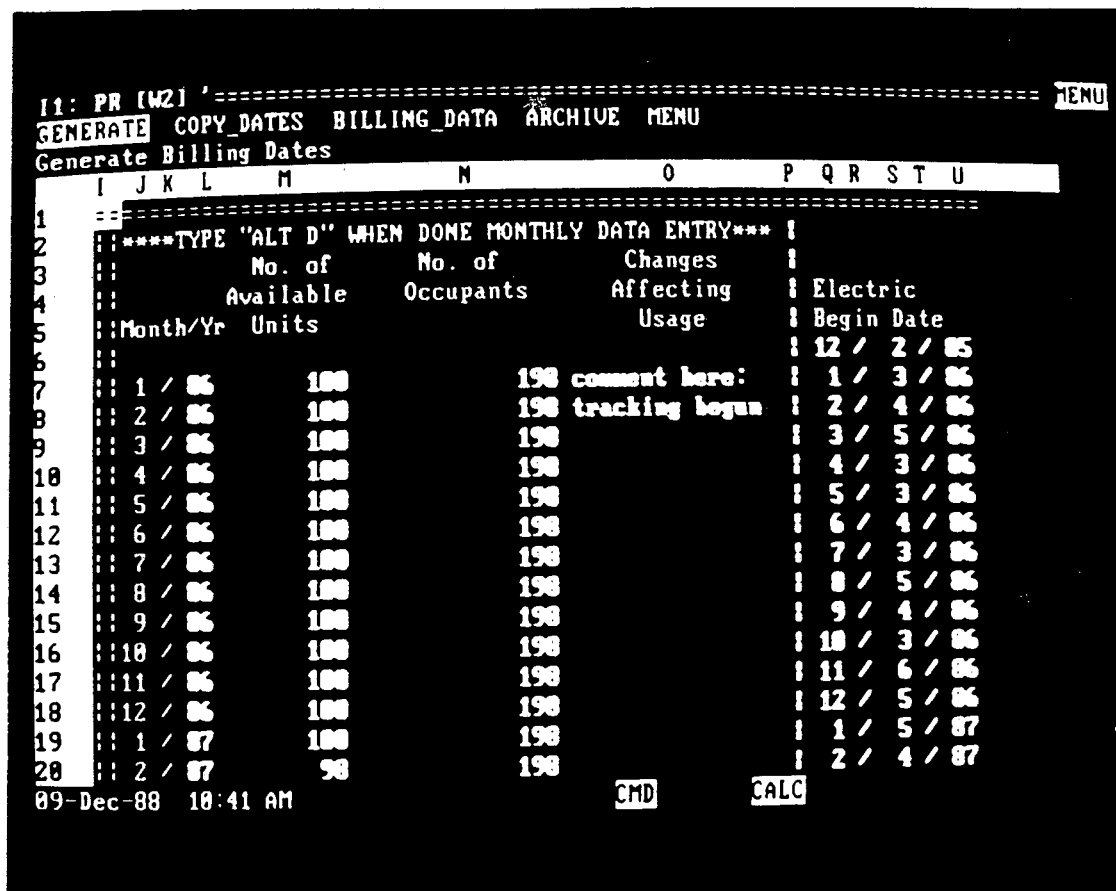


Figure 4. Monthly option of the Data Entry Worksheet. Monthly menu options appear at top of screen. Areas for data entry are highlighted. Sample data for a fictitious project are shown here; your MSTR_DEW will look different, since it contains placeholders (names, zeros, or blanks) rather than sample data.

- For each calendar month: (1) the number of *available* units, as defined by HUD, which may be different than the total number of dwelling units (see Glossary); (2) the total number of occupants (optional); and (3) the date and nature of any changes to the project (e.g., retrofits, rehabilitation, changes in the usage of an area, changes in metering etc.) which may have affected energy consumption during the period (optional).
- For all utilities: (1) all utility bills from the period you want to enter, plus the previous month (e.g., if you are entering 1985-1987, have all bills from January 1985-December 1987, *plus* December 1984); (2) from those bills, you will need: the billing cycle **begin** date, the billed consumption, and the billed cost.

About Starting Dates: In order to be able to combine worksheet files for later analysis, *it is essential that all worksheet files for your PHA begin with the same month and year*

(though the day of month may vary). This year will be the earliest you intend to record for any project. The worksheet's starting month will always be January, although you may begin entering billing data at any month you wish; simply leave the months before your project data blank. If a given project starts later than the PHA beginning year (e.g., the particular project was constructed later), start its DEW with the PHA begin year, and leave the years before the project data begins blank.

Pro-Rating Consumption and Costs: For billing periods that span more than one month (most common with heating oil), you should pro-rate the consumption on a monthly basis. That is, if one utility bill contains three months' consumption, enter one-third of the consumption and costs for each of the three months, and assign a reasonable begin date for each of the monthly intervals after the actual begin date (day of month).

Generating Dates

The **Generate** option allows you to generate a full seven years' (a single worksheet's maximum) of months and years within a project file, thus saving you data entry time and effort. However, you will still have to enter the begin date (day of month) for each billing cycle for each utility.

With the cursor highlighting **Generate**, press RETURN. The program prompts you for a year. Enter the *last two digits* of the year with which you are starting the monthly utility data entry (e.g., enter 85, *not* 1985).

The program asks you to **WAIT** as it generates the months and years. When it is finished, the date column for each utility will look like this: 1/ /85 (for example). You must then fill in the begin date (day of month) for each utility.

Copying Dates

The **Copy_Dates** option is another way to automatically produce billing dates for a project. For any given project, you may select either **Generate** or **Copy_Dates**, *but not both*.

It may be that two or more housing projects in your PHA are billed on precisely the same billing schedules (i.e., on the same billing dates for each month for each utility). The **Copy_Dates** option allows you to copy all utility billing cycle begin dates from a project file on disk to the current project file, thus saving you data entry time and effort.

With the cursor highlighting **Copy_Dates**, press RETURN. At the top of the screen, the program prompts you for the path and filename of the project file you want to copy the dates from. The program asks you to **WAIT** as it accesses the file on disk and copies that file's dates to the current file on screen. This process takes some time. Be patient.

Once the **READY** prompt appears, you may continue with data entry.

Note: If you use the **Copy_Dates** option, do not use the **Generate** option. Remember, however, that you should use the **Copy_Dates** option *only if* you have two or more projects that share identical billing cycles for *all* utilities included in the worksheet.

Entering the Billing_Data

With the cursor highlighting **Billing_Data**, press RETURN.

The worksheet can accept up to seven years of monthly utility data. Enter the monthly values for each fuel and for water and sewer. If one or more months is missing, enter a begin date for each missing month, but leave the usage and costs columns blank for the missing month(s). You *must* enter a begin date even if the monthly consumption and costs are missing. Similarly, for the worksheets to function correctly, each and every project file that you create must begin in the same year. If some periods are missing for certain projects, leave these missing consumption and cost rows blank.

Note: When entering usage and costs, do not use commas(,)--the program will insert them for you. Likewise with dollar amounts: do not enter commas nor dollar signs (\$)--the program will supply them. You should, however, enter decimal points (.) where necessary.

- *Month/Yr*

The worksheet displays the calendar month and year, beginning with the year you generated (or copied) dates from. There is nothing to enter in this column.

- *Number of Available Units*

Enter the number of *available* units for each calendar month, as defined by HUD, which may be different than the total number of dwelling units (see Glossary).

- *Number of Occupants*

Enter the total number of occupants for each calendar month (optional).

- *Changes Affecting Usage*

Note any changes to the project (e.g., retrofits, rehabilitation, changes in the usage of an area, changes in metering, etc.) which may have affected energy consumption during a given calendar month and beyond (optional).

- *Electricity Begin Date*

The Generate option has provided you with the month and year. Enter the electricity billing **begin** date (day of month).

- *Electricity Usage*

Enter the electricity usage for the billing cycle.

- *Electricity Demand*

Enter the electricity demand for the billing cycle (if applicable).

- *Electricity Usage Cost*

Enter the electricity usage cost for the billing cycle.

- *Electricity Demand Cost*

Enter the electricity demand cost for the billing cycle (if applicable).

- *Gas Begin Date*

The Generate option has provided you with the month and year. Enter the gas billing **begin** date (day of month).

- *Gas (therms or ccf)*
Enter the gas usage for the billing cycle.
- *Gas Cost*
Enter the gas cost for the billing cycle.
- *Oil Begin Date*
The Generate option has provided you with the month and year. Enter the oil billing **begin** date (day of month).
- *Oil (gallons #2, #4, or #6)*
Enter the oil usage for the billing cycle.
- *Oil Cost*
Enter the oil cost for the billing cycle.
- *Other Begin Date*
In place of "other," the utility you typed in as "other" in the Utility_Units section will appear here. The Generate option has provided you with the month and year. Enter the "other" billing **begin** date (day of month).
- *Other Consumption*
Enter the "other" usage for the billing cycle.
- *Other Cost*
Enter the "other" cost for the billing cycle.
- *Water Begin Date*
The Generate option has provided you with the month and year. Enter the water billing begin date (day of month).
- *Water gallons*
Enter the water usage for the billing cycle.
- *Water Cost*
Enter the water cost for the billing cycle.
- *Sewer Cost*
Enter the sewer cost for the billing cycle (usually shown as a separate item on the water bill).

Saving the Billing_Data

It's time to save this section of the worksheet. Press the ALT and D keys *simultaneously*. The program asks you to WAIT for a moment as it saves the information you've just entered. When the READY prompt appears, the cursor returns to the Monthly sub-menu.

Archiving the Project File

When all seven years in a project file have been filled, you must use the **Archive** option to save the full DEW and to create a new, continuing project file. The **Archive** option copies the most recent three years (five through seven) from the old file to the new file, then generates dates for years eight through eleven. By copying the three most recent

years, the three-year rolling base for utility consumption (required by the Performance Funding System) can be computed in year eight.

With the cursor on **Archive**, press RETURN. At the top of the screen, the program prompts you for the path and filename under which you wish to save the old file. Enter the old file's path and filename (e.g., C:\LOTUS\UTILITY\MYDEW1.WK1), then press RETURN. It is recommended that you name this file MYDEW1.WK1, where the "1" in the name indicates that this is the first archived worksheet. The program stores the first seven years of data in the file called MYDEW1.WK1. (Subsequently archived files might be named MYDEW2.WK1, MYDEW3.WK1, etc.) The current file (MYDEW0.WK1) now has three years of billing data (years five through seven), and you can continue entering subsequent months of data. The zero (0) file will always be the most current.

Note: If your PHA's fiscal year begins in a month other than January, seven fiscal years will not fit within one DEW. In that case, you will have to archive the DEW after six years.

Returning to the Main Menu

Use the SPACE BAR to highlight the Menu option, then press RETURN. This returns you to the main menu.

Print

The Print option allows you to print your data. Use the SPACE BAR to highlight the Print option, then press RETURN. The menu changes to the Print submenu, which consists of the following options: **Setup**, **Description**, **Utility_Units**, **Billing_Data**, **Adjusted_Billing**, and **Menu**.

Before You Begin

Before you begin, make certain that your printer is properly connected, that its power is turned on, and that it is on-line.

Setting Up Your Printer for Condensed Print

The Setup option allows you to enter your printer's 1-2-3 command string for condensed print. Condensed print is required to fit many of the worksheet's printouts across an 8.5" by 11" page.

With the cursor on **Setup**, press RETURN. At the top of the screen, the program prompts you for the 1-2-3 printer setup string for condensed print (usually, \015). Enter the string, then press RETURN.

Note: Consult your 1-2-3 manual for the condensed print command string for your printer. Depending on the default page width and length set up on your computer, you may need to adjust these to properly print the UAP output, using the standard 1-2-3 /Print Printer Options (/ppo). Press ESC to exit the DEW menu, reset these options with the 1-2-3 commands, then press ALT B to restore the DEW menu.

Printing Your Data

With the exception of **Setup** and **Menu**, when you choose one of the Print submenu options, the program prints the associated information. (In each case, the worksheet first prompts you to set the printer page to the top of form; do so, then press RETURN. See Figures 5 and 6.)

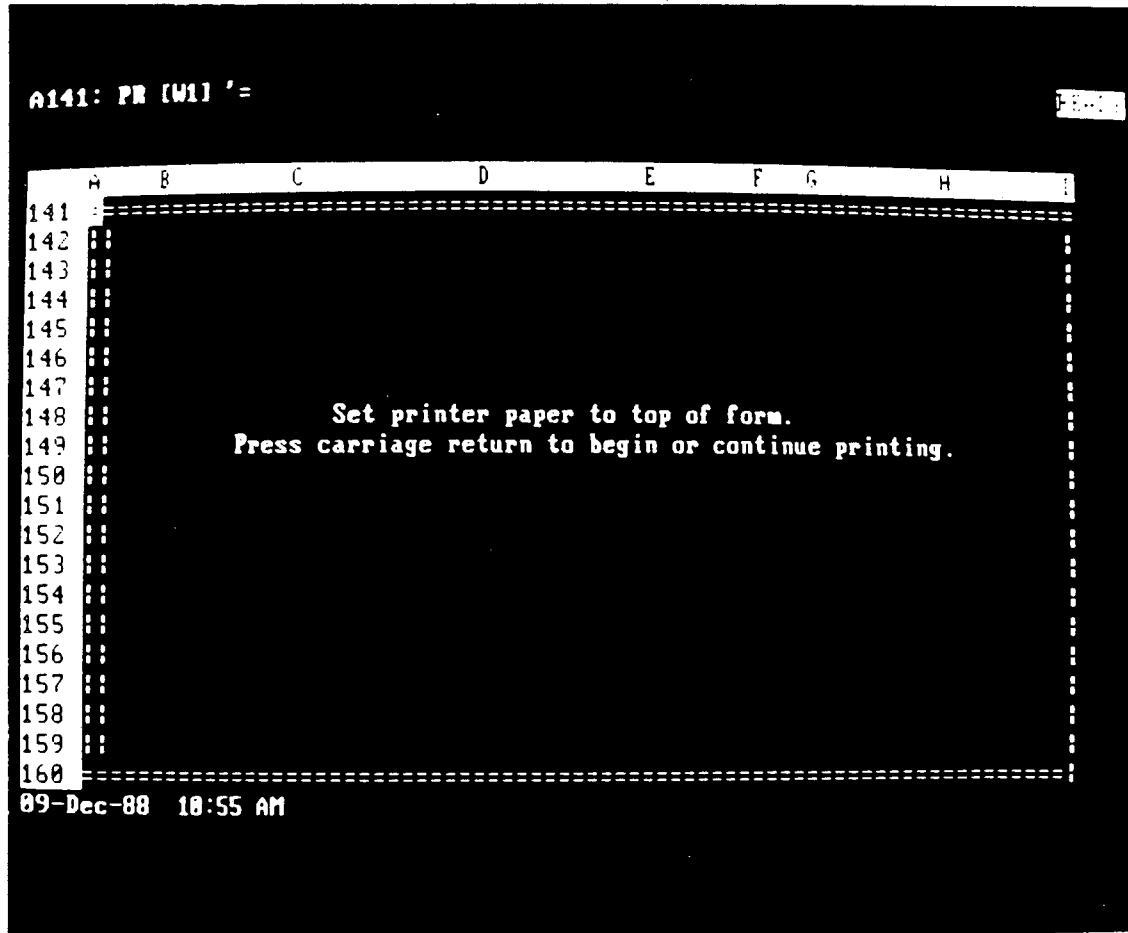


Figure 5. First Print screen of the Print menu of the Data Entry Worksheet. When you select a Print option, the program first goes to this screen, and pauses to allow you to adjust the printer paper. After the paper is adjusted, press RETURN to begin printing.

Description

With the cursor on **Description**, press RETURN. The program prints the project description as entered.

Utility_Units

With the cursor on **Utility_Units**, press RETURN. The program prints the utility units as entered.

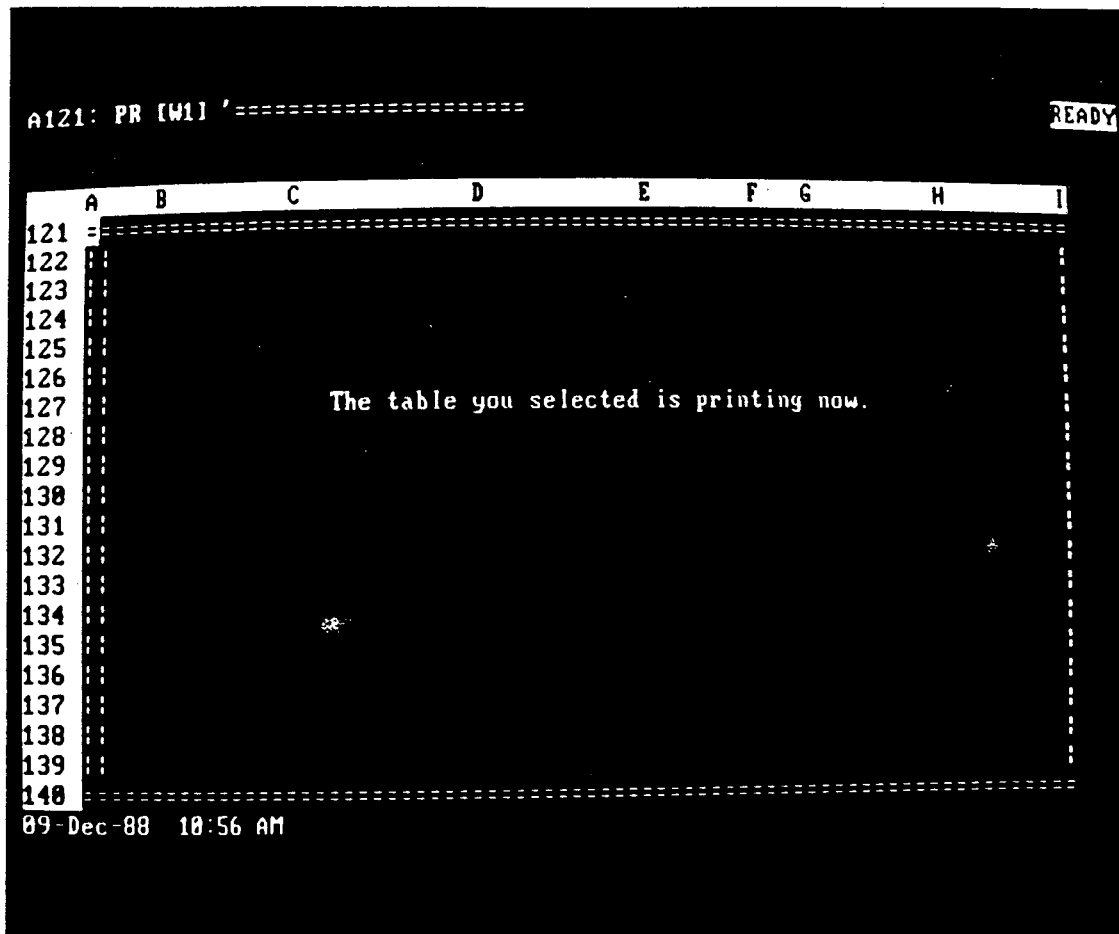


Figure 6. Second Print screen of the Print menu of the Data Entry Worksheet. The program goes to this screen while printing; the Print menu will reappear when printing is finished.

Billing_Data

With the cursor on **Billing_Data**, press RETURN. The program prints the raw monthly billing data as entered.

Note: You will print all seven years, even if you have entered fewer than seven years.

Adjusted_Billing

With the cursor on **Adjusted_Billing**, press RETURN. The program prints the billing data adjusted for calendar months and converted to common units.

Note 1: All seven years will be printed, even if you have entered fewer than seven years.

Note 2: The **Adjusted_Billing** section of the worksheet can also be displayed on screen; it is located just below the corresponding columns of the raw monthly data. You may notice that zero (0) often appears in the area. This should not be cause for alarm. Zero appears because the adjusted monthly usage and costs

are actually formulas. When there is no data for the formula to compute, the program places a zero in the cell. As you complete each year, the zero will disappear and the adjusted monthly usage and costs will take its place.

Returning to the Main Menu

Use the SPACE BAR to highlight the **Menu** option, then press RETURN. This returns you to the main menu.

Save

The **Save** option saves your project file.

Saving Your Work

If you've been saving your work all along with ALT D, there is no strict need for you to use the **Save** option. Nonetheless, as a precautionary measure (e.g., in the event you exited one of the menu options without pressing ALT D), it is recommended that you use the **Save** option when you finish with each project file.

Use the SPACE BAR to highlight the **Save** option, then press RETURN. The program asks you to WAIT for a moment as it saves the file. When the READY prompt appears, the cursor returns to the menu.

Quit

The **Quit** option quits 1-2-3 and exits back to DOS.

Quitting the DEW

Use the SPACE BAR to highlight the **Quit** option, then press RETURN. The program asks you if you have saved all changes and if you are sure you want to quit. Press Y to quit and exit to DOS, or press N to stay where you are.

Warning: If you quit without saving (i.e., if you quit without using ALT D or the **Save** option), all changes to your file since the last time you saved will be lost. You should quit without saving *only if* you do not want to keep the current changes.

CHAPTER 3 THE ENERGY ANALYSIS WORKSHEET

Loading the Energy Analysis Worksheet (EAW)

The Energy Analysis Worksheet, like the Data Entry Worksheet, is not a stand-alone program; it requires 1-2-3. To run 1-2-3 and load your working copy of the Master Energy Analysis Worksheet, follow these steps:

Note: If you're already in 1-2-3, skip steps 1 and 2.

1. Turn on your computer and, if you intend to use it, your printer.
2. Run 1-2-3 as you normally do. (If you don't know how to use 1-2-3, consult your 1-2-3 manual or specialist at your site.)

Note: If your computer system has two floppy disk drives but no hard disk, remove the 1-2-3 disk from drive A once the program loads. Now place the MSTR_EAW.WK1 disk in drive A. Put a floppy in drive B to save your EAW, using the **Begin** option. After executing **Begin**, remove the MSTR_EAW.WK1 disk from drive A. Then put the project files (DEWs) you want to analyze in drive A.

3. Once you are in 1-2-3, retrieve the Energy Analysis Worksheet file MSTR_EAW.WK1. To retrieve the file, use the standard 1-2-3 **/File Retrieve (/fr)** command.

The program asks you to **WAIT** as it retrieves the Energy Analysis Worksheet. (File retrieval takes about a minute on an AT computer and about two minutes on an XT.) Soon the **READY** prompt appears, and you will see the screen shown in Figure 7.

This is the Energy Analysis Worksheet (EAW). The EAW allows you to analyze the data previously entered in project files; it lets you produce graphs and tables for single buildings, and allows you to combine DEWs to produce summary graphs and reports.

Unlike the DEWs, normally you will work with a single EAW, with which you will use to analyze all your DEWs. However, once you have more than seven years of data stored in your DEWs, you will need to archive your EAW. See "Archiving the EAW" later in this chapter.

Before You Begin

Existing DEWs: To use the Energy Analysis Worksheet, you must have ready at least one (or more) DEW(s) with at least one (or more) year(s) of data entered.

Keystrokes and Data Entry: Just as with the standard 1-2-3 menus, use **RETURN** (or **ENTER**) to invoke the highlighted menu option. Use the **SPACE BAR** to move the cursor from one menu option to another, use the arrow keys, or simply type the first letter of the option. (To simplify instructions, this manual refers only to using the **SPACE BAR** when selecting a menu option.) Use the arrow keys to move around the worksheet.

There is some data entry required in a few sections of the EAW. Remember that only those cells that are highlighted on screen are for data entry. If you try to type over a protected (unhighlighted) cell, you'll get an error; if you get such an error, press **ESC** to continue, then press **ALT B** to redisplay the main menu. You do not need to enter data in *all* highlighted areas; some cells are highlighted because the program writes

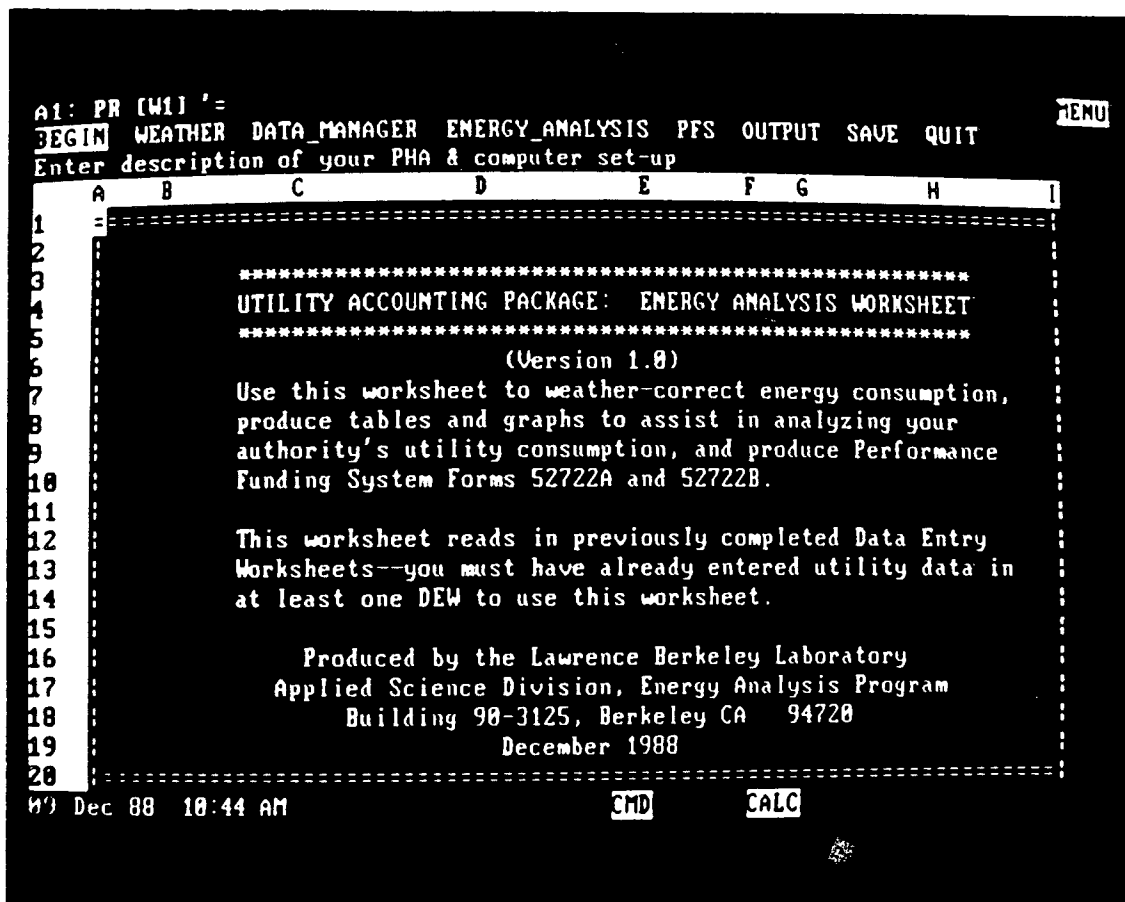


Figure 7. Opening screen of Energy Analysis Worksheet. Main menu options appear at top of screen.

information to them. See the instructions for each menu option for the exact areas for data entry.

Note: It may be that your display screen is unable to highlight characters. In that case, follow the instructions in this manual and see the photographs of screens for proper areas of data entry in the worksheet.

When entering large numbers, do not use commas--the program will insert them for you. Likewise with dollar amounts: do not enter commas nor dollar signs--the program will supply them. If you mistakenly enter a comma or dollar sign, the program will give you an error (press ESC to clear the error message, and ALT B to redisplay the main menu).

When entering alphabetic characters (labels), simply type the entry; the program will automatically supply the 1-2-3 prefix to left-adjust the entry.

The menu at the top of the screen will disappear after you select a menu option. When you save the EAW, as described below, the menu will automatically reappear. As with the DEW, you may press ALT B to make the menu reappear *without* saving.

Don't Mind the Formulas: You will notice that many of the cells in the spreadsheet contain formulas (e.g., $+(a1*b2)/c3$). These cells are protected; if you try to enter data in these cells, you will get an error. Restrict your data entry to the highlighted areas of the worksheet. Similarly, *never* delete or insert rows or use the 1-2-3 Move command to rearrange data in the master worksheets. If you need to move data (for example, data entered in the wrong place in the worksheet), use the 1-2-3 Copy then Range Erase commands. *Do not* use the 1-2-3 Move command; if you do, the formulas will be damaged.

Recalculation of Formulas: The formulas are not automatically recalculated as you make data changes (the recalculation has been set to manual). Instead, the recalculation is done when necessary (in order to speed up worksheet performance), such as when you save and before printing a table or graph. However, if you desire to recalculate the worksheet, you can do so by typing the F9 key at any time (provided the menu is not currently displayed).

Saving the EAW: Unlike the DEW, there is no one keystroke that saves sections of the EAW when saving or recalculation is required. Instead, there are several different "ALT" keystroke combinations that save and perform worksheet calculations, depending on the worksheet section. You will be instructed on screen and in this manual when such keystrokes are necessary. Be on the lookout for them. For your convenience, "Appendix A: "ALT" Command Quick Reference" contains a complete list of all ALT keystroke commands in the worksheets. Photocopy or remove this section for easy access.

Note: Please be aware that all costs reported and analyzed by the UAP are in nominal dollars only; they are not adjusted for inflation.

Begin

The **Begin** option sets important system parameters. You must select **Begin** before going on to any other option. Once the **Begin** parameters are set, however, you need not set them again--even between worksessions--unless, of course, one or more of them changes.

Select **Begin**. You will see the screen shown in Figure 8.

Enter the following information:

- *Public Housing Agency Name*

Enter your public housing agency name.

- *Fiscal Year Start (Jan, Apr, Jul, Oct)*

Enter your public housing agency's fiscal year starting month. Use only the three-letter abbreviations shown on screen for your fiscal year start.

Warning: If you enter a fiscal year starting month other than **Jan, Apr, Jul, or Oct**, you will get an "illegal entry" error when you try to save the **Begin** section (see below). If you get such an error, check the fiscal year starting month, type in the proper entry, then save again.

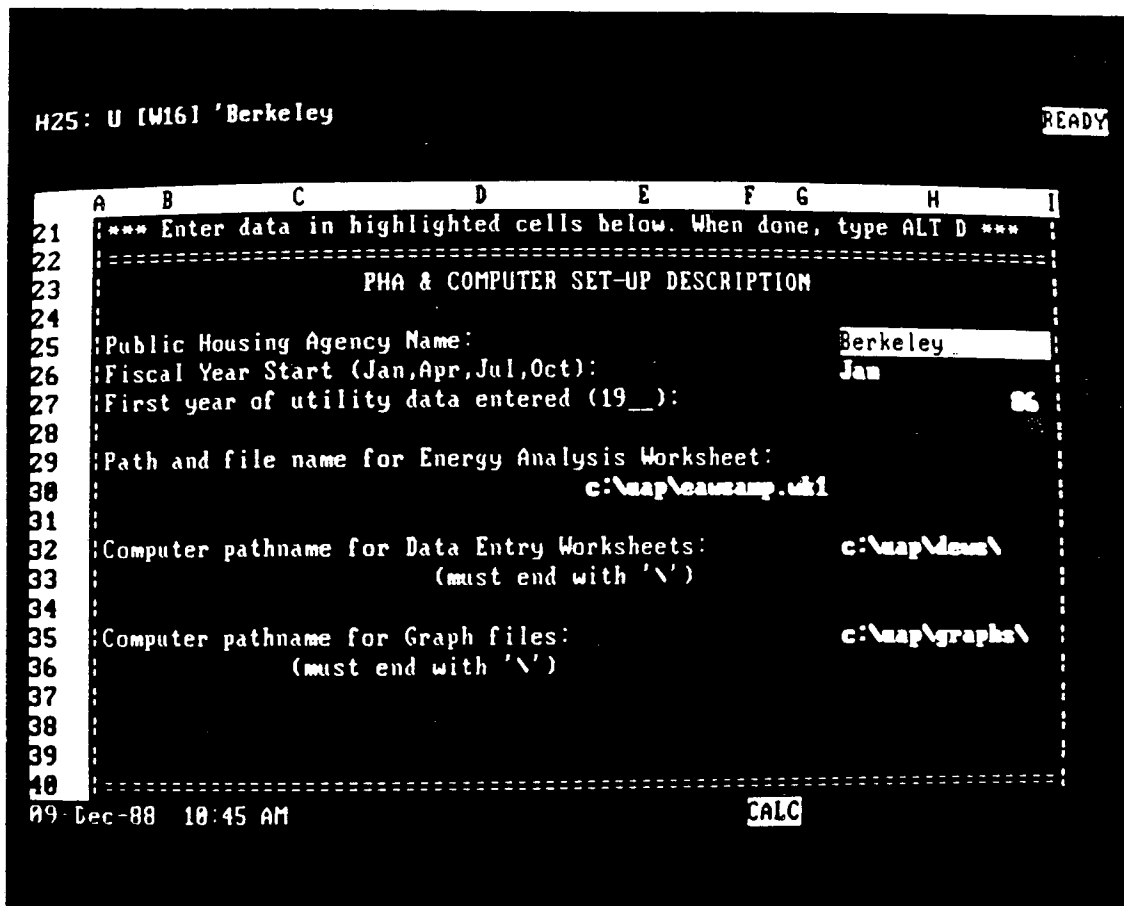


Figure 8. Begin option of the Energy Analysis Worksheet. Areas for data entry are highlighted. Sample data for a fictitious project are shown here; your MSTR_EAW will look different, since it contains placeholders (names, zeros, or blanks) rather than sample data.

- *First Year of Utility Data Entered*

Enter the earliest year for which you've entered data in a project file. This year must correspond to the first year of data in each DEW, which must be the same year across all DEWs. If the years fail to match, an error will appear when you try to read in the DEWs. For more information, see the "Read" section later in this chapter.

Note: The "first year of utility data entered" will automatically change after archiving. For more information, see "Archiving the EAW" later in this chapter.

- *Computer Path and Filename for Energy Analysis Worksheet*

Enter the path (disk directory plus any subdirectories) and the filename under which you wish to store the EAW (e.g., C:\LOTUS\UTILITY\MYEAW0.WK1 for a hard disk, or B:\MYEAW0.WK1 for a floppy.). This is the name the EAW will be saved under when you use the

Save option, or use the ALT keystroke combinations. It is recommended that you name this file "MYEAW0.WK1," where the "0" in the name indicates that this is the current EAW. (This should be a *new* name; using the name of a file which already exists will cause an error.)

Note: The EAW filename will automatically be updated after archiving. For more information, see "Archiving the EAW" later in this chapter.

- **Computer Pathname for Data Entry Worksheets**

Enter the path (disk directory plus any subdirectories) of the project files you want to analyze (e.g., C:\LOTUS\UTILITY\ for a hard disk, or A:\ for a floppy.). The path must end with a "backwards" slash (\).

- **Computer Pathname for Graph Files**

Enter the path (disk directory plus any subdirectories) in which you want to store graph files (e.g., C:\LOTUS\GRAPHS\ for a hard disk, or A:\ for a floppy.). The path must end with a "backwards" slash (\).

When You Are Finished

When you are finished, press ALT D. The program asks you to WAIT as it defines the date ranges based on your fiscal year start. (This process takes some time--seven minutes or more--depending on your machine's speed.) When the READY prompt appears, the cursor returns to the main menu.

Note 1: Remember that you only have to run the Begin option the first time you use the EAW. The information compiled when you pressed ALT D will automatically be saved between sessions.

Note 2: When saving to floppies, if you don't have a disk in the drive you've specified, you'll get the "Disk Drive Not Ready" error message. Press ESC then ALT B to restore the menu, and insert a disk and try again. Similarly, if you try to save to a floppy without enough storage space remaining, you'll also get an error message. Press ESC then ALT B to restore the menu, and insert a new disk and try again.

Weather

The Weather option allows you to enter the weather information (heating degree-days) for your region, and thereby allows the program to weather-correct energy consumption to reflect energy use which would have occurred in a year with average weather. (Your projects' consumption is automatically weather-adjusted when read into the EAW; see "Data_Manager" below). For information about obtaining climatological data for your region, please see Appendix C. The Weather option also allows you to archive the EAW.

Select Weather. The worksheet now moves to the Weather submenu.

Average

Select Average. You will see the screen shown in Figure 9.

Enter the monthly long-term average heating degree-days for your region in the cells provided. The "long-term average heating degree-days" are the monthly heating

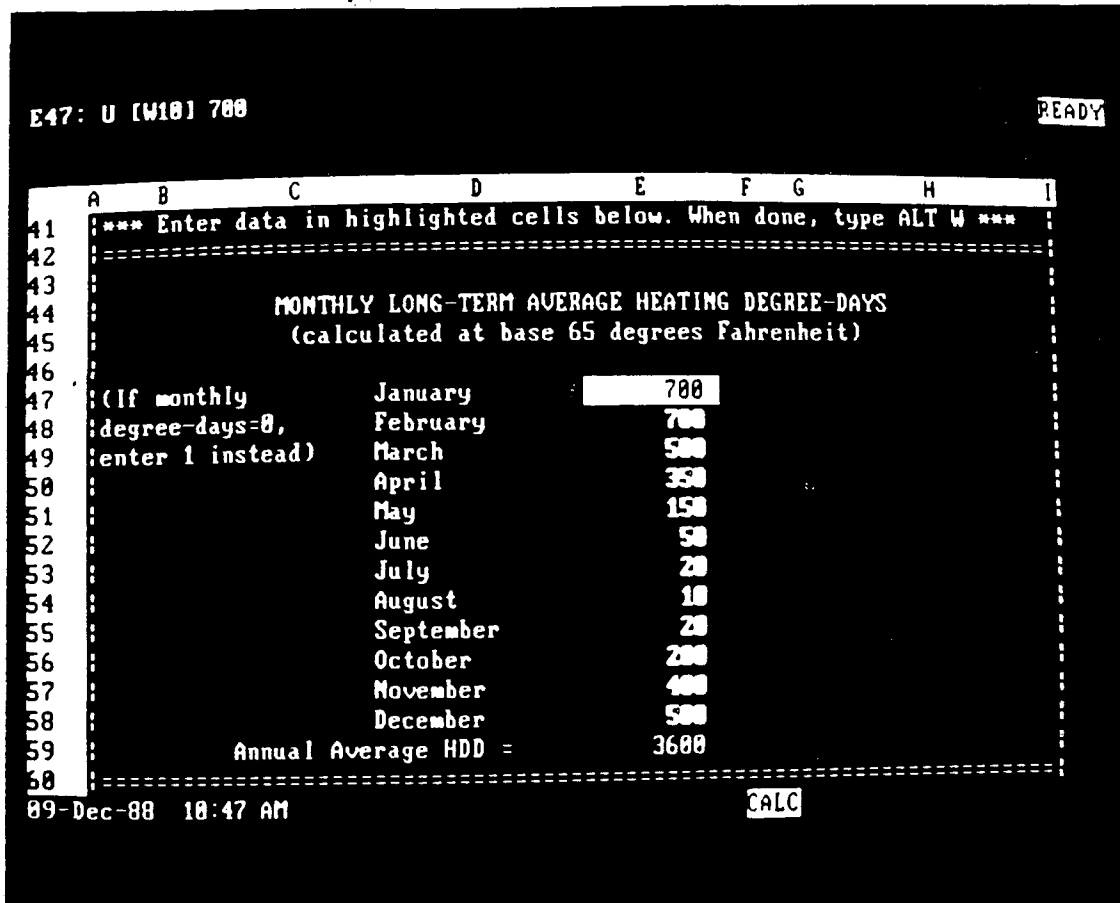


Figure 9. Average option of the Weather menu of the Energy Analysis Worksheet. Areas for data entry are highlighted. Sample data for a fictitious project are shown here; your MSTR_EAW will look different, since it contains placeholders (names, zeros, or blanks) rather than sample data.

degree-days for your location, averaged over 30 years to represent a typical year of weather. If there are no heating degree-days in a given month (monthly hdd=0), please enter "1" rather than "0" (to prevent errors from attempting to divide by zero). When you are finished, press ALT W to save the weather data.

Note: You need only enter the average heating degree-days once, as the averages do not change from year to year.

Yearly

Select Yearly. You will see the screen shown in Figure 10.

Enter the actual monthly heating degree-days for your region in the cells provided. Use the arrow keys to move down the list. If there are no heating degree-days in a given month (monthly hdd=0), please enter "1" rather than "0" (to prevent errors from attempting to divide by zero). When you are finished, press ALT W to save the weather

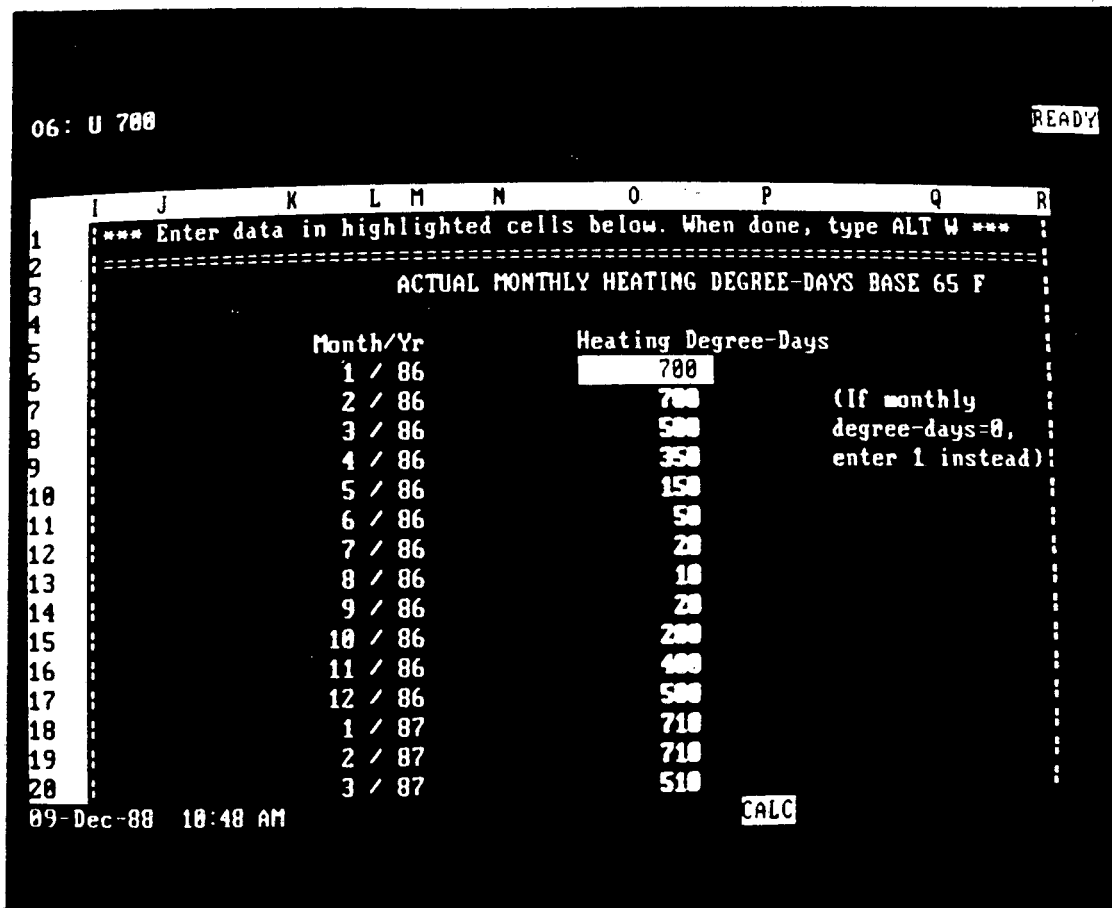


Figure 10. Yearly option of the Weather menu of the Energy Analysis Worksheet. Areas for data entry are highlighted. Sample data for a fictitious project are shown here; your MSTR_EAW will look different, since it contains placeholders (names, zeros, or blanks) rather than sample data.

data.

Note 1: You will have to update the actual monthly heating degree-days as such information becomes available.

Note 2: The weather information you enter may be printed out. Please see "Output" later in this chapter for more information.

Archiving the EAW

When all seven years of weather data have been filled, you must use the Archive option to save the full EAW and to create a new, continuing EAW. Archiving of the EAW will then correspond to the archiving of your DEW(s), because, of course, the subject DEWs and the weather data in the EAW must begin with the same year. The Archive option copies the most recent three years (five through seven) of weather data from the old file to the new file, then generates months for years eight through eleven.

With the cursor on **Archive**, press RETURN. At the top of the screen, the program prompts you for the path and filename under which you wish to save the old file. Enter the old file's path and filename (e.g., C:\LOTUS\UTILITY\MYEAW1.WK1 for a hard disk, or B:\MYEAW1.WK1 for a floppy), then press RETURN. It is recommended that you name this file MYEAW1.WK1, where the "1" in the name indicates that this is the first archived EAW. The program stores the first seven years of data in the file called MYEAW1.WK1. (Subsequently archived files might be named MYEAW2.WK1, MYEAW3.WK1, etc.) You can now use the archived EAW to analyze archived DEWs (for review of historical usage). The current file (MYEAW0.WK1) now has three years of weather data (years five through seven), and you can continue entering subsequent months of data as they become available. The zero (0) file will always be the most current.

Note: The **Archive** option automatically changes the "First Year of Utility Data Entered" and the "Computer Path and Filename for Energy Analysis Worksheet" in the **Begin** option.

Returning to the Main Menu

Select **Menu**. This returns you to the main menu.

Data_Manager

The **Data_Manager** option allows you to import the project file(s) you want to analyze.

Select **Data_Manager**. The worksheet now moves to the **Data_Manager** submenu.

List_DEWS

The **List_DEWs** option allows you to view a list of all worksheets stored in the DEW path (i.e., the DEW path as set with **Begin**). If you've forgotten the names of specific DEWs, this option allows you to view the names of all worksheets in the DEW path.

Select **List_DEWs**. The program prompts you to press RETURN once to view the list, then, when finished viewing the list, press RETURN again to return to the **Data_Manager** submenu.

Read

The **Read** option allows you to read in the monthly utility information from the DEWs you specify for analysis. (You can also read in a previously saved combination of DEWs with the **Read** option. See "Save_Combination" below.) If you've forgotten the names of specific DEWs, use the **List_DEWs** option (above) to view the names of all worksheets in the DEW path.

Select **Read**. You will see the screen shown in Figure 11.

Enter a DEW filename in one or more of the spaces provided. Press ALT R when finished. The program now stops to allow you to change floppies, if necessary. You will see the screen shown in Figure 12.

If your DEWs are stored on a hard disk, simply press RETURN. (After each DEW is read the program will pause again; simply continue to press RETURN until all specified DEWs from your hard disk are read.) If your DEWs are stored on floppies, place the

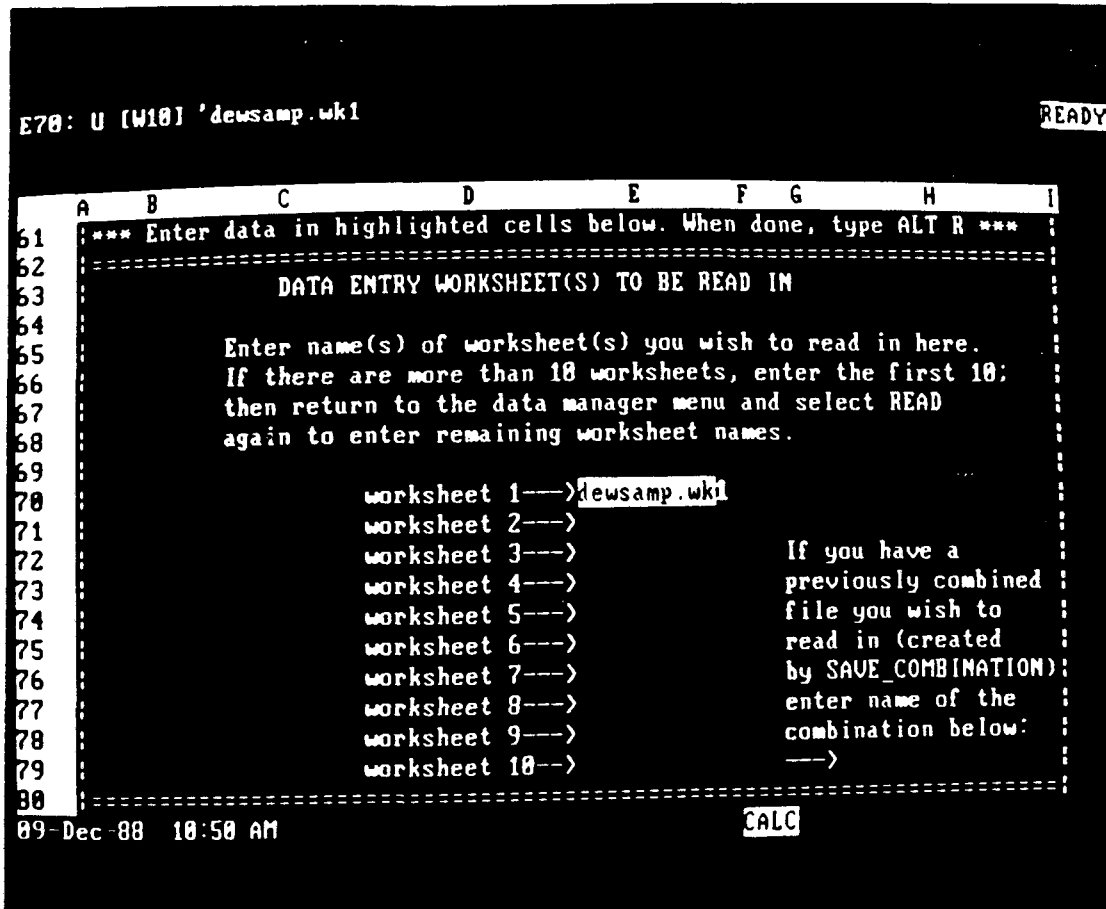


Figure 11. Read option of the Data_Manager menu of the Energy Analysis Worksheet. Areas for data entry are highlighted. Sample data for a fictitious project are shown here; your MSTR_EAW will look different, since it contains placeholders (names, zeros, or blanks) rather than sample data.

floppy with the specified DEW(s) on it in your drive. Then press RETURN. The program will pause again after each DEW is read from the current floppy. Repeat the process until all specified DEWs are read into the program.

The program asks you to WAIT as it reads in the monthly information from each of the specified project files. (Depending on the number of DEWs, and especially if you keep your DEWs on floppies, this process can take some time.) When the READY prompt appears, the cursor returns to the menu.

If you have more than ten worksheets you want to combine for analysis, type in the first ten and have the program read them in (press ALT R). Select Read again and type in the remaining DEW names. Now press ALT R to read in the monthly information from this second set of DEWs. The second set will be automatically combined with the information from the first set of worksheets you read in.

```

A161: PR (W1) '='
READY

  A   B   C   D   E   F   G   H   I
161  -----
162  |
163  |
164  |           READ option pausing for your input!
165  |
166  |
167  |
168  |   The READ option of the EAW is now pausing to allow
169  |   you to change floppy disks, if necessary, to read in
170  |   additional DEWs or combinations.
171  |
172  |   If your DEWs or combinations are stored on the hard disk,
173  |   simply press RETURN to continue reading them in.
174  |
175  |   If your DEWs or combinations are stored on floppies,
176  |   and you've read in all the files from the current floppy,
177  |   change the floppy now. Then press RETURN to continue
178  |   reading in DEWs or combinations.
179  |
180  -----
09-Dec-88 10:54 AM

```

Figure 12. Pause during Read option of the Energy Analysis Worksheet. After pressing ALT R, the program first goes to this screen and pauses to allow you to change disks.

Note: If you previously read in DEWs and you want to read in a new, separate DEW or set of DEWs, you must first use the Erase option. The Erase option removes the current information from the EAW. (Otherwise, the data from your new DEW(s) will be merged with the current data.) For more information, see "Erase" later in this chapter.

Warning: If the DEWs you specify do not start with the same year you specified as the "First Year of Utility Data Entered" in the Begin option, an error message will come up on screen. Follow the instructions in the message, then try the Read option again.

Save_Combination

The Read option extracts monthly utility information from the specified DEWs. The Save_Combination option allows you to save this combination of monthly data for future retrieval into the EAW. Use this option if there is a particular combination of DEWs you use and wish to come back to frequently. (Later, you can use the Read option to

retrieve the combination. Just type the combination's name under the "Combination" heading on the Read screen. Press ALT R to read in the specified combination.)

Select **Save_Combination**. The program prompts you for the name of the new combination (it must be a unique name). Type in a name, then press RETURN. (The program will automatically append the 1-2-3 .WK1 extension if you do not specify it.) The program asks you to WAIT as it saves the combination. When READY, the program returns you to the main menu.

Warning: If you enter a name that already exists in the DEW path, you will get an error. Press ESC to clear the ERROR indicator, then press ALT B to redisplay the menu. Now proceed again as instructed above.

Note 1: The combination is not updated automatically as you enter new data into the subject DEWs. You must save the subject DEWs as a new combination whenever the DEW data is updated.

Note 2: The combination saved is *not* formally a DEW. You will *not* be able to view the file without the EAW.

Erase

The **Erase** option allows you to clear the worksheet of the current combination of monthly utility data. Use this option before you read in a new DEW or DEW combination.

Select **Erase**. This erases the current DEW data from the EAW. When the erase is completed, the program returns you to the **Data_Manager** submenu.

Note: The EAW **Erase** option is different than the standard 1-2-3 **Range Erase** command. Please do not confuse them.

Returning to the Main Menu

Select **Menu**. This returns you to the main menu.

Energy_Analysis

The **Energy_Analysis** option allows you to view several tables and graphs. The tables and graphs produced by this option report the consumption and costs for the project or group of projects whose DEWs were read in using the **Data_Manager** option.

Note: Be sure to read the last section of this chapter, "How to Use the **Energy_Analysis** Option to Analyze Energy Consumption and Costs for Your Housing Authority," for ideas about how to apply the information garnered here to cut energy costs at your PHA.

Select **Energy_Analysis**. The worksheet now moves to the **Energy_Analysis** submenu.

Exec_Sum

The **Exec_Sum** option allows you to view an executive summary of utility costs and consumption (per available unit per month), totaled for each fiscal year.

Select **Exec_Sum**. The summary presents percentage changes in consumption from the previous year and changes in prices (where appropriate). At the bottom of the table, the summary contains the total number of unit-months available (UMA) and the number

of heating degree-days (HDD) per fiscal year.

When finished viewing, press RETURN to return to the Energy_Analysis submenu.

Note: All of the tables and reports that follow, including the Exec_Sum, may be printed out. Please see "Output" later in this chapter for more information.

Total_Annual

The **Total_Annual** option allows you to view the total annual utility consumption and costs, broken down by utility type and summed for each fiscal year.

Select **Total_Annual**. When finished, press RETURN to return to the Energy_Analysis submenu.

Sqft_Annual

The **Sqft_Annual** option allows you to view the annual utility consumption and costs per square foot of conditioned floor area, broken down by utility type and summed for each fiscal year.

Select **Sqft_Annual**. When finished viewing, press RETURN to return to the Energy_Analysis submenu.

Prices

The **Prices** option allows you to view the average utility prices for each fiscal year (calculated as total cost divided by total usage of each utility). Of course, these average prices do not reflect rate structures which may apply to particular utilities.

Select **Prices**. When finished viewing, press RETURN to return to the Energy_Analysis submenu.

Benchmark

The **Benchmark** option allows you to compare your projects' annual utility consumption (in kBtu per square foot) for a specified year with the consumption of other similar public housing projects and with that of a similar privately owned apartment building.

Select **Benchmark**. You will see the screen shown in Figure 13.

Enter the requested information:

- *Year of Energy Use Data to Compare*

Enter the year you wish to compare (type in the year's last two digits only, e.g., 88 *not* 1988). This year's data must of course be contained in the DEWs currently read into the EAW (see "Warning" below).

- *Average Number of Annual Heating Degree-Days*

The program supplies this figure based on the data you entered in **Weather**.

- *Three Letter Code Denoting Building Characteristics*

Enter **L** (lowrise--four or fewer stories) or **H** (highrise--five or more stories); then **C** (central heat) or **I** (individual heat); and enter **G** (gas heat) or **O** (oil heat) or **E** (electric heat). Enter the letters consecutively (i.e., as **LIO**, for example).

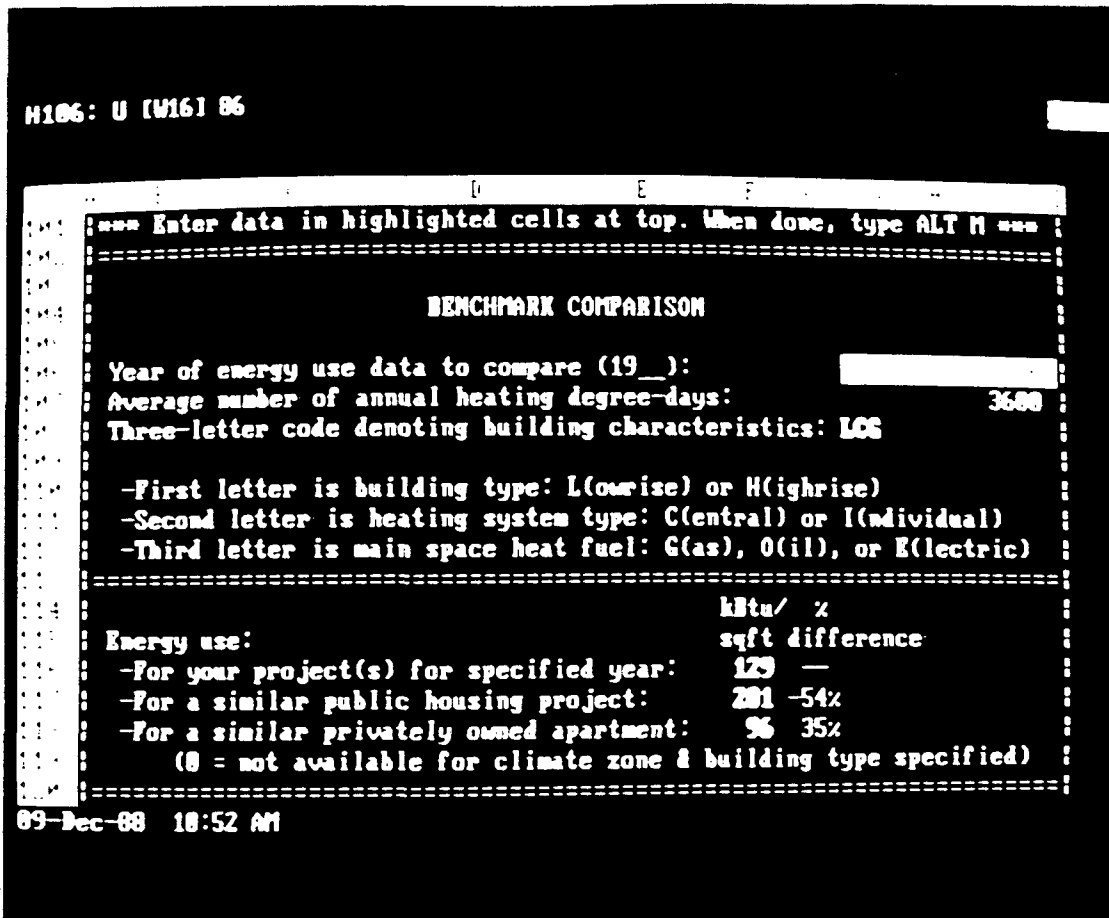


Figure 13. Benchmark option of the Energy_Analysis menu of the Energy Analysis Worksheet. Areas for data entry are highlighted. Sample data for a fictitious project are shown here; your MSTR_EAW will look different, since it contains placeholders (names, zeros, or blanks) rather than sample data.

Press ALT M when done. The program now calculates the comparisons for the specified year. The comparisons appears at the bottom of the Benchmark screen.

Warning: If the year you specify does not begin within seven years of the first year of utility data you specified in Begin, you will get the "illegal entry 1" message for the year cell. If the three-letter code is entered incorrectly, you will get the "illegal entry 2" message in the three-letter code cell. In either case, enter another year and/or three-letter code, then press ALT M again.

Note: Not all possible combinations of building characteristics and heating degree-days are available. If there is no corresponding consumption for the combination you've entered, a zero (0) will appear in the public and/or private housing cells.

The Benchmark comparisons for typical public and private housing are taken from:

Perkins and Will and the Ehrenkrantz Group, *An Evaluation of the Physical Condition of Public Housing Stock*, U.S. Department of Housing and Urban Development, H-2850, 1980.

Energy Information Administration, *Residential Energy Consumption Survey: Consumption and Expenditures, April 1984 through March 1985*, DOE/EIA-0321/1(84), 1987.

These figures represent *average* consumption for these groups. Special circumstances at your project, such as higher occupant density or large numbers of appliances, may make your usage higher than average, without the buildings necessarily being "energy wasters."

Graphs

The **Graphs** option allows you to view eight different graphs based on the current combination of DEWs.

Select **Graphs**. The worksheet now moves to the Graphs submenu.

When you select a particular graph, the graph is assembled in memory, displayed on screen, and stored as a 1-2-3 .PIC file in the directory you specified for graphs with the **Begin** section of the worksheet. All eight graphs may be printed out. To print out the graphs, however, you must exit the Energy Analysis Worksheet and use the PrintGraph feature in Lotus. For more information about PrintGraph, see your Lotus manual.

Note: In order to view graphs on screen your computer must have graphics capability. However, even if your system doesn't support screen graphics, you can still create a 1-2-3 .PIC file, then print the graphs with your printer using PrintGraph.

Graph 1: Monthly Energy Usage

Select **1**. This graph, a line plot, charts monthly energy usage (in weather-adjusted kBtu per square foot) for each year of data currently read into the EAW. (You will note that this is the only graph in the EAW that displays calendar years, i.e., January-December.) When finished viewing, press RETURN to return to the Graphs submenu.

Graph 2: Annual Water Usage

Select **2**. This graph, a bar chart, displays annual water usage (in M gallons per fiscal year). When finished viewing, press RETURN to return to the Graphs submenu.

Graph 3: Total Annual Energy Usage

Select **3**. This bar graph illustrates total annual energy usage (in weather-adjusted MBtu per fiscal year). When finished viewing, press RETURN to return to the Graphs submenu.

Graph 4: Annual Energy Usage per Square Foot

Select **4**. This bar graph charts annual energy usage per square foot (in weather-adjusted kBtu per square foot per fiscal year). When finished viewing, press RETURN to return to the Graphs submenu.

Graph 5: Total Annual Utility Costs

Select 5. This bar graph displays total annual utility costs (in dollars per fiscal year). When finished viewing, press RETURN to return to the Graphs submenu.

Graph 6: Annual Utility Costs per Available Unit

Select 6. This bar graph illustrates annual utility costs per available unit (in dollars per available unit per fiscal year). When finished viewing, press RETURN to return to the Graphs submenu.

More

Select More. This takes you to the second screen of the Graphs submenu.

Graph 7: Annual Utility Costs

Select 7. This graph, a pie chart, breaks down annual utility costs for the year you specify. Type in the year's last two digits only; e.g., 88 *not* 1988. The year you select will be displayed under the title of the graph. When finished viewing, press RETURN to return to the second screen of the Graphs submenu.

Graph 8: Annual Energy Usage

Select 8. This graph, another pie chart, breaks down annual energy usage for the year you specify. Type in the year's last two digits only; e.g., 88 *not* 1988. The year you select will be displayed under the title of the graph. When finished viewing, press RETURN to return to the second screen of the Graphs submenu.

Warning: If you select a year for graph 7 or 8 not currently contained in the EAW, an error message will come up on screen. Follow the instructions in the message, then select another year and try again.

Returning to the Graphs Submenu

Select Graphs. This returns you to the first screen of the Graphs submenu.

Returning to the Energy Analysis Submenu

Select Menu. This returns you to the Energy Analysis submenu.

Returning to the Main Menu

Select Menu. This returns you to the Main menu.

Performance Funding System (PFS)

The Performance Funding System option allows you to produce PFS forms 52722A and B. To produce these forms, you must have already read in the DEWs that will be categorized as "old" projects for the PFS. The EAW will calculate all PFS entries relating to "old" projects. You must enter all projects relating to "new" projects. For HUD definitions of "old" and "new" projects, see Appendix D.

Select PFS. The worksheet now moves to the PFS submenu.

Before You Begin

Before you begin, see Appendix D for PFS instructions. Use the **Read** option to combine all projects to be categorized as "old". Obtain information for "new" projects and "second fuel" consumption. Note that the energy usage reported on the PFS forms by the UAP is *not* weather-corrected. For line 16 of the Second PFS Form, you must apply the HDD change factor supplied by HUD to the consumption figures to be entered. The change factor is *not* automatically applied by the program.

First_PFS_Form (52722A)

Select **First_PFS_Form (52722A)**. In a moment, a facsimile of the form comes up on screen. Enter information in the **header** of the form regarding old and new project numbers, fiscal year ending, revision number, and AC contract number. You must also enter data on **lines 05, 08, and 10**, and you must complete all entries in the **Second Fuel** column. (The line numbers specified refer to the line numbers on the PFS form, *not* to 1-2-3 worksheet rows.) Use the arrow keys to move around the worksheet. When you are finished, press ALT P to save the form.

Note: The data you enter are not updated until you press ALT P.

Second_PFS_Form (52722B)

Select **Second_PFS_Form (52722B)**. In a moment, a facsimile of the form comes up on screen. Enter information in the **header** of the form regarding HDD adjustment factor, fiscal year ending, revision number, and AC contract number. You must also enter data on **lines 16 and 21** and you must complete *all* entries in the **Second Fuel** column. (The line numbers specified refer to the line numbers on the PFS form, *not* to 1-2-3 worksheet rows.) Use the arrow keys to move around the worksheet. When you are finished, press ALT Q to save the form.

Note: The data you enter are not updated until you press ALT Q.

Returning to the Main Menu

Select **Menu**. This returns you to the main menu.

Output

The **Output** option allows you to print the tables and forms found in the **Begin**, **Weather**, **Energy_Analysis**, and **PFS** sections of the worksheet. (In each case, the worksheet first prompts you to set the printer page to the top of form; do so, then press RETURN.)

Note: Before you begin, make certain that your printer is properly connected, that its power is turned on, and that it is on-line.

Select **Output**. The worksheet now moves to the Output submenu.

Setting Up Your Printer for Condensed Print

The **Setup** option allows you to enter your printer's 1-2-3 command string for condensed print. Condensed print is required to fit many of the worksheet's printouts across an 8.5" by 11" page.

Select **Setup**. At the top of the screen, the program prompts you for the 1-2-3 printer set up string for condensed print (usually, \015). Enter the string, then press RETURN.

Note: Consult your 1-2-3 manual and/or your printer manual for the condensed print command string for your printer. Depending on the default page width and length set up on your computer, you may need to adjust these to properly print the UAP outputs, using the standard 1-2-3 **Print Printer Options (/ppo)**. Press ESC to exit the EAW Output menu, reset these options with the 1-2-3 commands, then press ALT B to restore the EAW Output menu.

Printing Your Data

With the exception of **Setup** and **Menu**, when you choose one of the Output submenu options, the program prints the associated information. (In each case, the worksheet first prompts you to set the printer page to the top of form; do so, then press RETURN. See Figures 5 and 6 in Chapter Two.)

Begin

Select **Begin**. The program prints the Begin parameters as entered.

Avg_HDD

Select **Avg_HDD**. The program prints the average heating degree- days as entered in Weather.

Yearly_HDD

Select **Yearly_HDD**. The program prints the yearly heating degree- days as entered in Weather.

Exec_Sum

Select **Exec_Sum**. The program prints the executive summary as viewed in Energy_Analysis.

Total_Annual

Select **Total_Annual**. The program prints the total annual energy usage and costs as viewed in Energy_Analysis.

Sqft_Annual

Select **Sqft_Annual**. The program prints the annual utility usage and costs per square foot as viewed in Energy_Analysis.

More

Select **More**. This takes you to the second screen of the Output submenu.

Prices

Select **Prices**. The program prints the average utility prices as viewed in *Energy_Analysis*.

Benchmark

Select **Benchmark**. The program prints the benchmark comparisons as viewed in *Energy_Analysis*.

First_PFS_Form (52722A)

Select **First_PFS_Form**. The program prints the PFS form 52722A as viewed in PFS.

Second_PFS_Form (52722B)

Select **Second_PFS_Form**. The program prints the PFS form 52722B as viewed in PFS.

Output

Select **Output**. The **Output** option takes you back to the first screen of the **Output** sub-menu.

Returning to the Main Menu

Select **Menu**. This returns you to the main menu.

Save

The **Save** option saves your EAW.

If you've been saving your work all along using the specified "ALT" keystrokes, there is no strict need for you to use the **Save** option. Nonetheless, as a precautionary measure (e.g., in the event you exited one of the menu options without saving), it is recommended that you use the **Save** option before exiting the EAW.

Select **Save**. The program asks you to **WAIT** for a moment as it saves the file. When the **READY** prompt appears, the cursor returns to the menu.

Quit

The **Quit** option quits 1-2-3 and exits back to DOS.

Select **Quit**. The program asks you if you have saved all changes and if you are sure you want to quit. Press **Y** to quit and exit to DOS, or press **N** to stay where you are.

Warning: If you quit without saving, all changes to your file since the last time you saved will be lost. You should quit without saving *only if* you do not want to keep the current changes.

How to Use the Energy_Analysis Option to Analyze Energy Consumption and Costs for Your Housing Authority

Utility bills can be used to save money in a variety of ways. By tracking energy usage, you can identify equipment and maintenance problems that cause increased consumption before they get out of hand. Utility bills can also help you to target the most effective retrofit options by showing which fuels (and therefore, which end uses) have excessively high usage and are most in need of retrofit.

The tables and graphs produced by the Energy_Analysis option help you to identify buildings with excessive energy consumption and to identify buildings whose energy usage has changed drastically over time. There are three main approaches to identifying buildings with excessive energy consumption:

1. Compare with past costs for the same building;
2. Compare costs for similar buildings within your PHA;
3. Compare with national average usage for similar buildings.

Examining Historical Consumption and Costs for the Same Building

One way to detect excessive utility charges is to examine utility costs in a particular building over the past several years. Graphs 5 and 7 show total utility costs, while the Total_Annual table displays total annual costs for each utility. Graph 6 adjusts total utility costs by the number of available units.

If costs are increasing, you must determine whether rising prices or higher usage are to blame. If *prices* are increasing (see Prices table), you might consider switching fuel(s). You should always check that your utility is billing you on the proper rate structure for each fuel. Also, determine if your utility assesses electricity demand charges (i.e., charges for the amount of electricity used at any one time, rather than the total energy consumed over the billing period). If you are billed for electrical demand, retrofit options that reduce peak usage may be attractive.

Total energy *consumption* is shown in graphs 3 and 8; water usage appears in graph 2. Total utility usage is listed in the Total_Annual table. If consumption is increasing, consider the factors that might account for this. Have there been changes in the conditioned floor area of the project? Graph 4 and the Sqft_Annual Table show energy use adjusted for square footage; increasing energy usage may reflect an increased number and/or use of appliances, a leak in distribution lines, or broken or improperly maintained equipment that requires repair or replacement for optimum efficiency.

Also look at which end uses (space heat, cooling, water heating, cooking, lights and appliances) are supplied by the various energy sources your project uses. By examining which fuels are increasing, you can decide which end uses are most in need of energy-reducing efforts. Graph 1 allows you to examine changes in baseload consumption at your project (i.e., non-space heating/cooling consumption). Changes in baseline use reflect increases or decreases in energy used for water heating, cooking, lighting, or appliances.

Examining Consumption and Costs for Similar Buildings in Your PHA

While comparing historical and current energy use at a particular site alerts you to changes in consumption, it does not indicate whether usage in a particular building has always been higher than it needs to be. One way to detect higher-than-average consumption is to compare similar buildings within your PHA. Compare the utility use per square foot (shown in the Sqft_Annual table) for each of your projects. You should examine the projects whose energy use is higher than average, and ask yourself if there are particular factors about the "high users" that might justify their consumption. Such factors might include a large number of occupants per apartment, many appliances, tenants with special needs (e.g., elderly tenants who require high indoor temperatures), or common spaces such as laundry, office, meeting room, or enclosed parking facilities. If there are no such extenuating circumstances, these "high users" are probably good candidates for energy conservation retrofits.

Comparing with National Average Usage

In addition to comparing a building's consumption to that of other projects in your PHA, you can also see how it compares to national average statistics of public and privately owned housing consumption. In the Benchmark section of the worksheet, energy usage for your building is compared with the average public and private multifamily consumption for similar buildings (in kBtu/sqft), grouped on the basis of: (1) climate zone, (2) building type, (3) space heat system, and (4) space heat fuel. All possible combinations of these categories are not represented; if consumption is not available for your building's category, a zero (0) will appear in the table. Bear in mind that consumption in privately owned buildings is usually somewhat lower than in public housing projects. As mentioned in the previous section, particular factors at your project may justify higher-than-average usage.

An Example

The sample tables and graphs in Appendix E illustrate how high-usage buildings and end uses can be identified. The Annual_Total table shows that electricity demand, electricity usage, oil, and water costs have increased markedly over the seven years shown. Further investigation of the Prices table uncovers a doubling of electricity demand rates, from \$1 to \$2/kW; all other utility prices are increasing slowly. The Sqft_Annual table and graph 4 show that electricity usage, oil, and water usage are all increasing over the seven years reported. And, when graph 1 is consulted, you can see that it is the baseload (non-weather-dependent) usage that is growing; the space heating portion remains relatively constant. The Utility_Units table tells us that electricity is used only for lights and appliances, while oil is used for water heating. Therefore, it appears that lights, appliances, and hot water use are the growing end uses, and are good targets for retrofit efforts.

For More Information

If you want further information about reducing energy use in public housing projects, consult the following publications:

Technical Publications

- C. Goldman, K. Greely, and J. Harris, "Retrofit Experience in U.S. Multifamily Buildings: Energy Savings, Costs, and Economics," LBL Report No. 25248, Lawrence Berkeley Laboratory, Berkeley, CA, 1988. For a free copy, please call: (415) 486-7288.
- K. Greely, C. Goldman, and R. Ritschard, "Analyzing Energy Conservation Retrofits in Public Housing: Savings, Cost- Effectiveness, and Policy Implications," LBL Report No. 21886, Lawrence Berkeley Laboratory, Berkeley, CA, 1986. For a free copy, please call: (415) 486-7438.
- E. Mills, R. Ritschard, and C. Goldman, "Financial Impacts of Energy Conservation in Public Housing," LBL Report No. 21741, Lawrence Berkeley Laboratory, Berkeley, CA, 1986. For a free copy, please call: (415) 486-7438.

Trade Publications

- *Maintenance and Modernization Supervisor*, a monthly newsletter for PHA personnel. For subscription information, please write or call: P.O. Box 535, Olney, MD 20832, (301) 924-5490.
- *The Professional Energy Manager*, a monthly newsletter published by the Association of Professional Energy Managers. For subscription information, please write or call: 717 Market Street, Suite 404, San Francisco, CA 94103, (415) 777-3566.
- *Home Energy*, a national bi-monthly magazine which emphasizes the field of residential energy conservation; departments include: Trends in Energy, Multi-Family Conservation, Appliances, Conservation Programs, Health and Indoor Air Quality, Book and Video Reviews, Conservation Tips, Resource Listings, Product Listings, and Calendar of Events. For subscription information and a free sample issue, write or call: *Home Energy Magazine*, 2124 Kittridge, Suite 95, Berkeley, CA 94704-9942, (415) 524-5405.

Also remember that local utilities often supply free energy audits and many sponsor retrofit financing programs.

APPENDIX A "ALT" COMMAND QUICK REFERENCE

Here is a list of all ALT key combinations used in the Data Entry and Energy Analysis Worksheets. Post a copy of this list in your workplace for quick reference while using the Utility Accounting Package.

Data Entry Worksheet ALT Commands:

ALT + key	Purpose
ALT B	Restore main menu <i>without</i> saving
ALT D	Exit Description , Utility_Units , and Billing_Data options --recalculates worksheet, saves data, and restores main menu

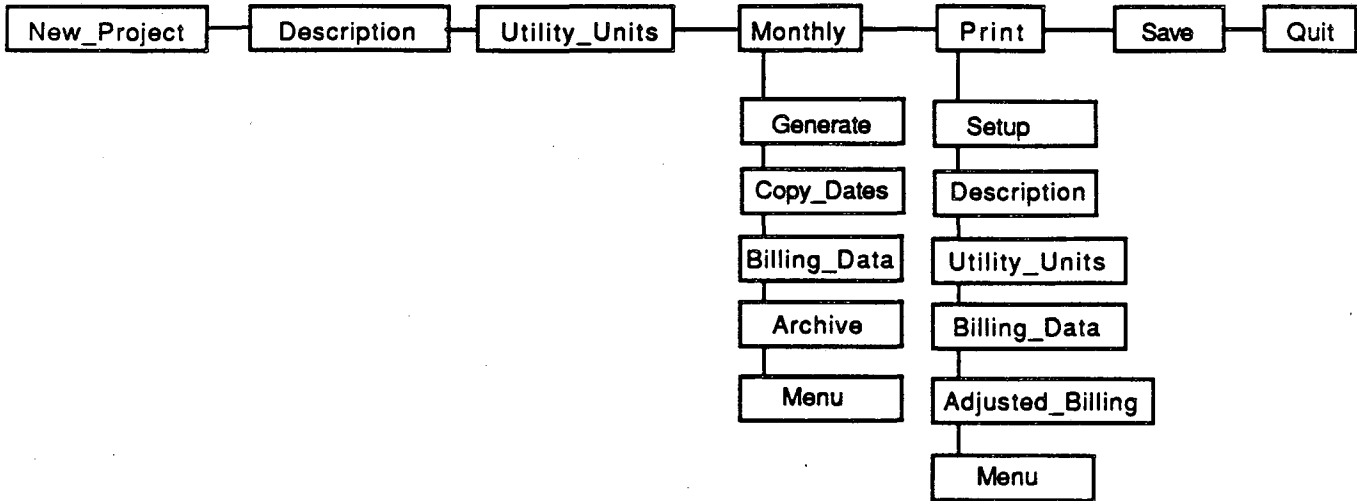
Energy Analysis Worksheet ALT Commands:

ALT + key	Purpose
ALT B	Restore main menu <i>without</i> saving
ALT D	Exit Begin option --creates ranges based on fiscal year starting month --recalculates worksheet, saves data, and restores main menu
ALT M	Exit Benchmark option --looks up multifamily and public housing usage for similar building type --recalculates worksheet, saves data, and restores main menu
ALT P	Exit First_PFS_Form(52722A) option --fills in rolling base usage for specified year --recalculates worksheet, saves data, and restores main menu
ALT Q	Exit Second_PFS_Form(52722B) option --fills in utility usage for specified year --recalculates worksheet, saves data, and restores main menu
ALT R	Exit Read option --reads in specified DEWs or combinations --recalculates worksheet, saves data, and restores main menu
ALT W	Exit Average and Yearly Weather options --recalculates worksheet, saves data, and restores main menu

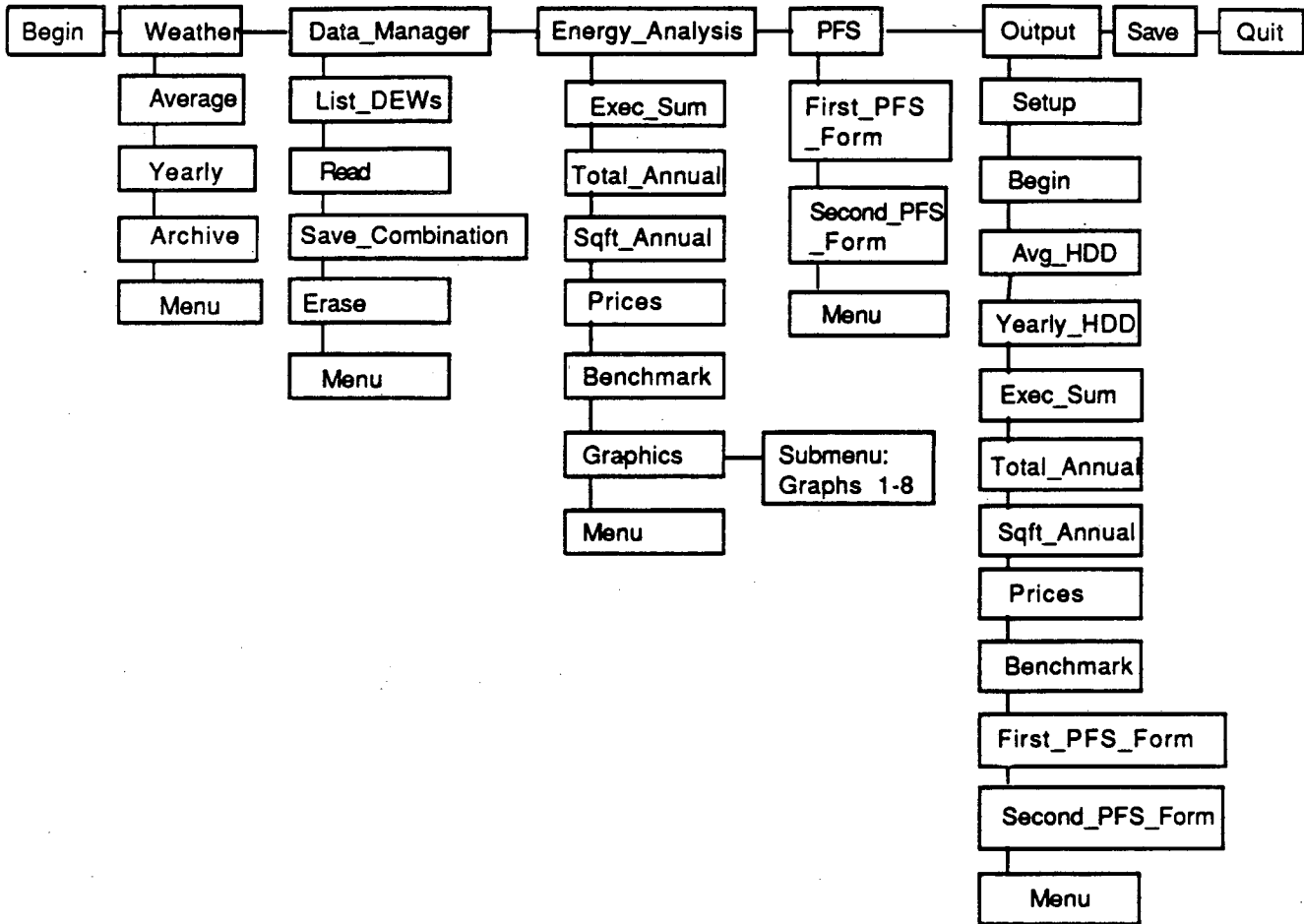
APPENDIX B WORKSHEET MENUS

The flowcharts on the following two pages illustrate the structure of the Data Entry and Energy Analysis Worksheets.

Data Entry Worksheet: Menu Structure



Energy Analysis Worksheet: Menu Structure



APPENDIX C HOW TO OBTAIN WEATHER INFORMATION

The EAW uses monthly heating degree-days (HDD base 65°F) to weather-correct space heating consumption in your projects. It does this for the utilities you specify as the primary and/or secondary space heat fuels in the DEW (Utility_Units option). No correction is made for cooling consumption. Weather-correction is done as follows:

$$Energy_{wc} = [(Energy_{raw} - Energy_{min}) * \frac{LTA_HDD}{Actual_HDD}] + Energy_{min}$$

where:

- $Energy_{wc}$ = weather-corrected monthly energy usage
- $Energy_{raw}$ = raw monthly energy usage
- $Energy_{min}$ = lowest monthly energy usage over a year
- LTA_HDD = long-term average monthly heating degree-days base 65°F
- $Actual_HDD$ = actual monthly heating-degree days base 65°F

Yearly minimum consumption approximates the non-space heating baseload usage (i.e., domestic hot water use, cooking use). Weather-correction requires that you input average heating degree-days for each month (using the Average option in Weather), as well as inputting actual monthly heating degree-days for each period you have utility data (using the Yearly option in Weather).

For Actual Monthly Heating Degree-Days: Local Climatological Data (LCD) is available for the 280 primary stations shown in the table on the next page. Locate the station nearest you and order the LCD report from the National Climatic Data Center (NCDC). The subscription fee is \$8.50/year for one city. The reports are mailed about two months following the end of each month. Data for 10,000 stations are available in the State Climatological Data Reports. The subscription fee is \$14.50/year for all stations in a state. These reports are mailed three months following the given month.

Historical heating degree-days for the past 20 years are contained in the Annual Summaries of Local Climatological Data. This report can be obtained from NCDC for one dollar. (Historical heating degree-days are required to weather-correct utility data used in the rolling base period.)

For Average Monthly Heating Degree-Days: Long-term average heating degree-days are available for all stations in each state. Order "Climatological #81" from NCDC. The report costs one dollar.

Note: Prices listed here are current as of the time of publication, but are subject to change without notice.

For more information, contact:

National Climatic Data Center
Federal Building
Asheville, NC 28801-2696
(704) 259-0682

**LOCAL CLIMATOLOGICAL DATA
PUBLISHED STATIONS
(Monthly and Annual)
MARCH 1988**



**U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE
NATIONAL CLIMATIC DATA CENTER
FEDERAL BUILDING
ASHEVILLE, NORTH CAROLINA 28801**

ALABAMA _____ BIRMINGHAM AP A _____ BIRMINGHAM CO _____ HUNTSVILLE _____ MORLEY _____ MONTGOMERY ALASKA _____ ANCHORAGE _____ ANNETTE _____ BARROW _____ BARTER ISLAND _____ BETHEL _____ BETTLES _____ BIG DELTA _____ COLD BAY _____ FAIRBANKS _____ GULIKANA _____ HOMER _____ JUNEAU _____ KING SALMON _____ KODIAK _____ KOTZEBUE _____ MCGRATH _____ NOME _____ ST PAUL ISLAND _____ TALKLEETNA B _____ UNALASKA _____ VALDEZ _____ YAKUTAT ARIZONA _____ FLAGSTAFF _____ PHOENIX _____ TUCSON A _____ WINSLOW A _____ YUMA ARKANSAS _____ FORT SMITH A _____ LITTLE ROCK AP A _____ N. LITTLE ROCK CALIFORNIA _____ BAKERSFIELD _____ BISHOP _____ BLUE CANYON A _____ EUREKA _____ FRESNO _____ LONG BEACH _____ LOS ANGELES AP A _____ LOS ANGELES CO _____ REDDING _____ SACRAMENTO _____ SAN DIEGO _____ SAN FRANCISCO AP A _____ SAN FRANCISCO CO _____ SANTA BARBARA _____ SANTA MARIA _____ STOCKTON COLORADO _____ ALAMOSA _____ COLORADO SPRINGS _____ DENVER _____ GRAND JUNCTION _____ PUEBLO CONNECTICUT _____ BRIDGEPORT _____ HARTFORD DELAWARE _____ WILMINGTON DISTRICT OF COLUMBIA _____ WASHINGTON NATIONAL AP _____ WASHINGTON DULLES INT'L AP AP = AIRPORT CO = CITY OFFICE	FLORIDA _____ APALACHICOLA _____ DAYTONA BEACH _____ FORT MYERS _____ GAINESVILLE _____ JACKSONVILLE _____ KEY WEST _____ MIAMI _____ ORLANDO _____ PENSACOLA _____ TALLAHASSEE _____ TAMPA _____ VERO BEACH _____ WEST PALM BEACH GEORGIA _____ ATHENS _____ ATLANTA _____ AUGUSTA _____ COLUMBUS _____ MACON _____ SAVANNAH HAWAII _____ HILO _____ HONOLULU _____ KAHULUI _____ LIMUE IDAHO _____ BOISE _____ LEWISTON _____ POCAHELLO ILLINOIS A _____ CAIRO _____ CHICAGO O'HARE AP _____ MOLINE _____ PEORIA _____ ROCKFORD _____ SPRINGFIELD INDIANA _____ EVANSVILLE _____ FORT WAYNE _____ INDIANAPOLIS _____ SOUTH BEND IOWA _____ DES MOINES _____ DUBUQUE _____ SIOUX CITY _____ WATERLOO KANSAS _____ CONCORDIA _____ ODDGE CITY _____ GOODLAND _____ TOPEKA _____ WICHITA KENTUCKY _____ JACKSON _____ LEXINGTON _____ LOUISVILLE _____ PADUCAH LOUISIANA _____ BATON ROUGE _____ LAKE CHARLES _____ NEW ORLEANS _____ SHREVEPORT MAINE _____ CARIBOU _____ PORTLAND MARYLAND _____ BALTIMORE	MASSACHUSETTS A _____ BOSTON _____ BLUE HILL OBS _____ WORCESTER MICHIGAN _____ ALPENA _____ DETROIT _____ FLINT _____ GRAND RAPIDS _____ MOUNTAIN LAKE _____ LANSING A _____ MARQUETTE _____ MUSKEGON _____ SAULT STE. MARIE MINNESOTA _____ DULUTH _____ INTERNATIONAL FALLS _____ MINNEAPOLIS ST PAUL _____ ROCHESTER _____ ST CLOUD MISSISSIPPI _____ JACKSON _____ MERIDIAN _____ TUPELO MISSOURI _____ COLUMBIA _____ KANSAS CITY INT'L AP _____ KANSAS CITY DOWNTOWN AP _____ ST. LOUIS _____ SPRINGFIELD MONTANA _____ BILLINGS _____ GLASGOW _____ GREAT FALLS B _____ HAVRE _____ HELENA _____ KALISPELL _____ MILES CITY _____ MISSOULA NEBRASKA _____ GRAND ISLAND _____ LINCOLN _____ NORFOLK _____ NORTH PLATTE _____ OMAHA EPPLEY AP _____ OMAHA (NORTH) _____ SCOTTSBLUFF _____ VALENTINE NEVADA _____ ELKO _____ ELY _____ LAS VEGAS _____ RENO _____ WINNEMUCCA NEW HAMPSHIRE _____ CONCORD A _____ MT WASHINGTON NEW JERSEY _____ ATLANTIC CITY AP A _____ ATLANTIC CITY STATE MARINA _____ NEWARK NEW MEXICO A _____ ALBUQUEQUE _____ CLAYTON _____ ROSWELL NEW YORK _____ ALBANY _____ BINGHAMTON _____ BUFFALO _____ ISLIP A _____ NEW YORK CENTRAL PARK _____ N.Y. J.F. KENNEDY INT'L AP _____ N.Y. LAGUARDIA FIELD _____ ROCHESTER _____ SYRACUSE NORTH CAROLINA _____ ASHEVILLE _____ CAPE HATTERAS _____ CHARLOTTE _____ GREENSBORO _____ RALEIGH _____ WILMINGTON NORTH DAKOTA _____ BISMARCK _____ FARGO _____ WILLISTON OHIO _____ AKRON-CANTON _____ CINCINNATI AP _____ CLEVELAND _____ COLUMBUS _____ DAYTON _____ MANSFIELD _____ TOLEDO _____ YOUNGSTOWN OKLAHOMA _____ OKLAHOMA CITY _____ TULSA OREGON B _____ ASTORIA _____ BURNS _____ EUGENE _____ MEDFORD _____ PENDELTON _____ PORTLAND _____ SALEM _____ SEKTONG SUMMIT PACIFIC ISLANDS B _____ GUAM _____ JOHNSTON _____ KOROR _____ KWAJALEIN _____ MAJURO _____ PAGO PAGO _____ PONAPE _____ TRUK (NDEN) _____ WAKE _____ YAP PENNSYLVANIA _____ ALLENTOWN _____ AVOCA WILKES-BARRH SCRANTON AP _____ ERIE _____ HARRISBURG _____ PHILADELPHIA _____ PITTSBURGH _____ WILLIAMSPORT RHODE ISLAND A _____ BLOCK ISLAND _____ PROVIDENCE SOUTH CAROLINA _____ CHARLESTON AP _____ CHARLESTON CO _____ COLUMBIA _____ GREENVILLE SPARTANBURG SOUTH DAKOTA _____ ABERDEEN _____ HURON _____ RAPID CITY _____ SIOUX FALLS TENNESSEE _____ BRISTOL _____ CHATTANOOGA _____ KNOXVILLE _____ MEMPHIS _____ NASHVILLE A _____ OAK RIDGE TEXAS _____ ABILENE _____ AMARILLO _____ AUSTIN _____ BROWNSVILLE _____ CORPUS CHRISTI _____ DALLAS FORT WORTH _____ DEL RIO A _____ EL PASO A _____ GALVESTON _____ HOUSTON _____ LUBBOCK _____ MIDLAND _____ PORT ARTHUR _____ SAN ANGELO _____ SAN ANTONIO _____ VICTORIA _____ WACO _____ WICHITA FALLS UTAH _____ MILVORD _____ SALT LAKE CITY VERMONT _____ BURLINGTON VIRGINIA _____ LYNCHBURG _____ NORFOLK _____ RICHMOND _____ ROANOKE B _____ WALLOPS ISLAND WASHINGTON _____ OLYMPIA _____ TULLAYUTI A _____ SEATTLE-TACOMA AP _____ SEATTLE CO _____ SPOKANE _____ STAMPEDE PASS _____ WALLA WALLA _____ YAKIMA B _____ WEST INDES _____ SAN JUAN AP _____ WEST VIRGINIA _____ HUNLEY _____ CHARLESTON _____ CHARLES _____ MOUNTAIN ZIMBABWE _____ GREEN BAY _____ LA CHOSSE _____ MADISON _____ TRLWAUREI WYOMING _____ CASPER _____ LARAMIE _____ SHERIDAN
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B SEE PUBLICATION RECORD ON REVERSE.
 A MONTHLY SUMMARY DOES NOT INCLUDE 3-HOURLY OBSERVATIONS.
 B ANNUAL SUMMARY NOT ISSUED.

APPENDIX D PERFORMANCE FUNDING SYSTEM INSTRUCTIONS

The following pages are taken from HUD transmittal Handbook No. 7475.13 CHG-19, which was issued May 18, 1988. These instructions are current as of the time of publication of this manual, but may be superseded by future HUD transmittals. They are reproduced here to assist you in generating PFS forms 52722A and B using the Utility Accounting Package (see the PFS option in the Energy Analysis Worksheet).



PERFORMANCE FUNDING
SYSTEM HANDBOOK

7475.13 CHG-19

APPENDIX 10



U.S. Department of Housing
and Urban Development
Office of Public and Indian Housing

Calculation of Allowable
Utilities Expense Level

PHA/IHA-Owned Rental Housing
Performance Funding System

OMB Approval No. 2577-0029

Line No.	Description	Old Project Numbers (Data listed on lines 1,2,3)			New Project Numbers (Data listed on line 8)			Fuel (Specify type e.g. oil, coal, wood)	Submission <input type="checkbox"/> Original <input type="checkbox"/> Revision No. ()
		Unit Months Available (2)	Sewage and Water Consumption (4)	Electricity Consumption (5)	Gas Consumption (6)	Fiscal Year Ending AC Contract Number (7)			
01	UMA and actual consumption for old projects for 12 month period which ended 12 months before the Requested Budget Year								
02	UMA and actual consumption for old projects for 12 month period which ended 24 months before the Requested Budget Year								
03	UMA and actual consumption for old projects for 12 month period which ended 36 months before the Requested Budget Year								
04	Accumulated UMA and actual consumption of old projects (sum of lines 01, 02, 03)								
05	Estimated Unit Months available for old projects for Requested Budget Year								
06	Ratio of Unit Months available for old projects (line 04 divided by the 05 of column 3)	3							
07	Estimated UMA and consumption for old projects for Requested Budget Year (each figure on the 04 divided by the 05)								
08	Estimated UMA and consumption for new projects								
09	Total estimated UMA and consumption for old and new projects for Requested Budget Year (line 07 + line 08)								
10	Estimated cost of consumption on the 09 for Requested Budget Year (see Instructions)								
11	Total estimated cost for Requested Budget Year (sum of columns of the 10)								
12	Est. PUM cost of consumption for Requested Budget Year (Absolute Utilities Expense Level) (line 11 divided by line 04, col. 3)								
12a	Rate								
12b	Unit of Consumption								

Form HUD-S772-A (4/88)

Previous Editions are Obsolete

APPENDIX 10

Instructions

1. **General.** This form shall be used solely for PHA/HA-owned rental housing projects. A separate form shall be submitted for each Annual Contributions Contract (ACC) which includes one or more projects which have reached the End of Initial Operating Period (EIOP) and will be in management for all or any part of the PHA/HA fiscal year for which the PHA/HA is eligible for Performance Funding System (PFS) Operating Subsidy. This form shall not be used with respect to the Section 23 Leased Housing Program, the Section 23 Housing Assistance Payments Program, the Section 8 Housing Assistance Payments Program, the Mutual-Help Program, or the Turnkey III or Turnkey IV Homeownership Opportunity Programs. In addition, this form is not applicable to the PHAs/HAs of Alaska, Puerto Rico, the Virgin Islands or Guam, which are not subject to the PFS. The PFS regulation covering the purpose for the calculation required by this form is Section 900.107 of 24 CFR Part 900.

2. Preparation and Submission of Form.

Heading. In the spaces provided, enter: name of the Public Housing Agency or Indian Housing Authority; the fiscal year ending date for the year for which the form is being prepared; the Annual Contributions Contract Number; a check (✓) indicating an original submission or a revision and revision number; and the project identification number of those projects classified as "Old Projects" where the required data is listed on lines 01, 02, and 03, and "New Projects" where the required data is listed on line 08.

Columns 7, 8, and 9. Specify the type(s) of fuel being consumed by inserting the type(s) in one or more of the columnar headings (e.g., oil, coal or wood).

Special Instructions Regarding Lines 01, 02 and 03:

Rolling Base Period. The Rolling Base Period allowable average utility consumption is computed by using data recorded on lines 01, 02 and 03. The Rolling Base Period is applicable for PHA/HA fiscal years beginning January 1, 1983, and thereafter.

Rolling Base Period of Less Than 36 Months. Section 900.107(c)(2) of the PFS regulations states that if a PHA/HA has not maintained or cannot recapture consumption data nor develop comparable consumption data regarding a particular utility or utilities from its records or from the records of a comparable project, for the full Rolling Base Period, it may request HUD Field Office approval to utilize data for a period of at least 12 months. If HUD approves the use of data for a period of at least 12 months but less than 36 months, it shall be expanded to the full Rolling Base Period by use of the actual experience, plus estimated consumption for the period for which no record of experience is available. The estimated consumption may be based upon the actual experience. Take into account the relationship of the heating degree days of the periods of actual experience and the missing experience when considering utilities used for space heating. If consumption of a comparable project is utilized, that consumption must have taken place during the same periods of the PHA/HA's Rolling Base.

Adjustment of the Consumption of the Rolling Base Period. To avoid a distortion of the average consumption for the three 12 month periods of the Rolling Base Period, the actual consumption or equivalent listed on each of these lines must be for the same number of units. Also, the consumption mix, by purposes for which each type of utility is consumed, must be the same in each year, for example, there must not be a switch in use of gas to oil or vice-versa. The unit months available (UMAs) will be the same for all three lines. Needed adjustments to achieve this result are provided below in section 3.

Line 01. By type of utility, enter the actual or adjusted consumption, in the appropriate units of measurement, for the 12-month period which ended twelve months before the requested budget year. In column 3, enter the number of UMAs during this same 12-month period. For example, a PHA with a fiscal year beginning 1/1/83 would report for the period from 1/1/81 through 12/31/81. Include only dwelling units and their consumption which were in management for the entire Base Period or are not specifically excluded from line 01 by the instructions of section 3 below. The unit months would include those units where all utilities are tenant-purchased.

Line 02. Refer to instructions for line 01 above, except the consumption to be recorded on line 02 for a fiscal year beginning 1/1/83 would be for the 12-month period from 1/1/80 through 12/31/80, which is the period ended twenty four months before the requested budget year.

Line 03. Refer to instructions for line 01 above, except the consumption to

be recorded on line 03 for a fiscal year beginning 1/1/83 would be for the 12-month period from 1/1/79 through 12/31/79, which is the period ended thirty six months before the requested budget year.

Line 04. Enter the sum of lines 01, 02, and 03 in each column.

Line 05. Enter the number of UMAs during the requested budget year for Old Projects. This number must be the same as the UMAs shown on lines 01, 02 and 03, column (3) of this form. If the UMAs in the requested budget year are not the same as each period of the Rolling Base Period, see instructions contained in the second paragraph of section 3, below.

Line 06. Divide UMAs in column (3) of line 04 by UMAs in column (3) of line 05 to determine the ratio of UMAs available in the accumulated years to the UMAs available in the requested budget year. If the ratio is different than 3, there has been an error in stating UMAs on lines 01, 02, 03, 04, and/or 05.

Line 07. Divide each consumption amount and the UMAs on line 04 by the ratio in column (3) of line 06 (3) and enter each answer in the appropriate column of line 07.

Line 08. A "New Project" for the purpose of establishing the Rolling Base Period and the Allowable Utilities Expense Level is defined as either:

- A project which has not been in operation during at least 12 months of the Rolling Base Period, or a project which enters management after the Rolling Base Period and before the end of the Requested Budget Year.
- A project which during or after the Rolling Base Period has experienced: a conversion from one energy source to another; interruptible service sufficient to cause discernible variance from normal consumption pattern; a period in which the project is unoccupied; a switch from tenant-supplied to PHA/HA-supplied utilities; or a switch from PHA/HA-supplied to tenant-supplied utilities.

Specific instructions for establishing or adjusting utility consumption for each of the above mentioned possibilities are outlined in section 3 below.

Line 09. Enter the sum of line 07 and line 08 for UMAs and all consumption columns. Even if the utilities for one or more units are all tenant-purchased, the UMAs for such units must be included in column 3 of this line. The UMAs also will be included in the category of Old Projects (line 01, 02 and 03) or new projects (line 08), as appropriate. In all cases, the total UMAs shown in column (3) of line 09 must be the same as the UMAs shown on form HUD-62723, "Calculation of Performance Funding System Operating Subsidy."

Line 10. Compute the estimated costs attributable to the estimated consumption for each utility based on monthly rate schedules for each meter or unit price, and enter in the appropriate column. The current applicable rates in effect at the time the Operating Budget is submitted to HUD will be used as the utilities rates for the Requested Budget Year, except where prior to the date of submission of the budget to HUD, the appropriate utility commission has approved rate increases for future implementation. In these instances, the new rates may be used as the utility rates for the entire Requested Budget Year.

Line 11. Enter in column (3) the sum of all columns of line 10.

Line 12. Divide the amount in column (3) of line 11 by UMAs shown in column (3) of line 09. Enter the resulting PUM amount in this line and on the line titled "Allowable Utilities Expense Level" of form HUD-62723.

Line 12a. Enter for each type of utility or fuel the rate or unit price used to compute the estimated costs shown for each utility or fuel on line 10.

Line 12b. Indicate for each type of utility or fuel the unit of measurement (e.g. therms, kilowatt hour, gallons, cubic feet, 100 cubic feet, tons) which relates to the consumption shown for each utility or fuel on lines 01 thru 04.

3. Situations Requiring Special Adjustments to Lines 01 Through 08.

Actual consumption of projects having the situations described in section 2, "Line 08", above, shall be established or adjusted in accordance with the instructions contained in this paragraph. The overriding consideration of all of the adjustments which are discussed here is that the consumption data shall not be distorted by including in lines 01, 02, 03, 05 or 07 of this form any UMAs or consumption for projects for only part of the Rolling Base Period or Requested Budget Year, and that the consumption mix, by purposes for which given utilities are used, will be the same for each such line. Where there is usage or a specific type of delivery or usage mix for only a part of the

PERFORMANCE FUNDING
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APPENDIX 10

Rolling Base Period, either it will be eliminated from lines 01, 02, 03, 05 and 07 and, after appropriate adjustment, incorporated into line 08, or the total Rolling Base Period (lines 01, 02 and 03) will be adjusted to show a comparable situation as to usage mix for each unit in each twelve month period. Information supporting the special adjustments shall accompany this form.

New Project Not In Management During at Least 12 Months of the Rolling Base Period. The allowable consumption and UMAs for a project specified in section 2, the first subpart of "Line 08", above, shall not be included in lines 01, 02 or 03, but the allowable consumption levels and UMAs shall be entered in line 08 of this form. For the project in management for less than 12 months of the Rolling Base Period or one entering management after the Rolling Base Period but before the end of the Requested Budget Year, annual allowable consumption data shall be determined by using the consumption experience of a project (same PHA/HA or other PHA/HA) with comparable types of utilities and which is likely to have comparable per unit levels of consumption based on the physical characteristics of the buildings. Such experience must have occurred during the Rolling Base Period and must be for 12 months or more. If more than 12 months are used, the experience must be annualized. The annual consumption and UMAs shall then be adjusted to reflect the number of months the project is expected to be in management during the Requested Budget Year. The resulting allowable consumption levels and UMAs shall be entered on line 08. The HUD Field Office will provide these figures on request. Once this project has accrued 12 months experience, its allowable utilities consumption level for the next Requested Budget Year will be entered on this form in accordance with the instructions of "Rolling Base Period of Less Than 36 Months" in section 2.

Switch of Utilities - Energy Conversion: If the PHA/HA has converted the units of a project from one energy source to another (e.g., from oil to coal) during or after the Rolling Base Period, or will convert before the end of the Requested Budget Year, the following adjustments are required for the Rolling Base Period and/or line 08.

- **For Discontinued Utility.** Exclude actual consumption of these units in the column on lines 01, 02 and 03.

- **For New Utility:**

- **Between One and Three Years of Experience.** If there has been more than one, but less than three years of consumption experience during the Rolling Base Period, use such actual experience, plus estimated consumption for the time which had no experience, in the appropriate column on lines 01, 02 or 03. Line 08 is not to be used. Avoid overlapping estimated and actual consumption experience. As a means of estimating the missing consumption of the new space heating utility, the PHA/HA's calculation could be based upon the old utility consumption for the missing period, using the relative BTU equivalent. If the PHA/HA requires assistance to compute BTU equivalents, it should request it from the Field Office.

- **Less Than One Year of Experience.** If there is less than one year of consumption experience as to the new utility during the Rolling Base Period, estimate the annual consumption and include it in the appropriate column on each of lines 01, 02 and 03. Line 08 is not to be used. In estimating, use actual consumption experience available. Consider the consumption patterns of comparable projects if such information is available. Avoid overlapping estimated consumption and actual experience. The BTU equivalent system mentioned in the preceding paragraph could be utilized to compute the missing experience.

- **Switch After Rolling Base Period.** If the switch is between the Rolling Base Period and the start of the Requested Budget Year, estimate consumption for a full year for the new utility, as if for a "New Project," (see the second paragraph of part 3, above) and enter estimated consumption on line 08.

If the date of the switch to the new utility will result in its use for a part of the Requested Budget Year, estimate the consumption of the discontinued utility for the number of months of the Requested Budget Year it will be used, and estimate the consumption of the new utility for the number of months it will be used, and include these estimates on line 08, in the appropriate columns. The estimate for the discontinued utility shall be based on historical data of the Rolling Base Period, and the estimate for the new utility shall be made as if for "New Project" (see the second paragraph of part 3, above). Once the PHA/HA has

experienced actual consumption of the new utility for some part of the Rolling Base Period, the new utility shall be considered in accordance with the instructions in the preceding paragraph, "Less Than One Year of Experience."

Unit Months Available. When a switch of utilities occurs, no adjustment of UMAs is required for lines 01, 02, or 03. Also do not enter UMAs on line 08, as this will duplicate the UMAs already shown on lines 01, 02 and 03.

Interruptible Service. If the PHA/HA has a utilities combination which provides for interruptible service from one energy source to another, the HUD Field Office shall be contacted to determine a reasonable estimate of consumption to be used in calculating the allowable utility expense for the Requested Budget Year if the interruption is sufficient to cause discomparable variance from normal consumption pattern. This adjustment would, of course, not be considered until after the interruption had occurred and, if possible, not until after the heating season has ended.

Unoccupied Projects. For a project that will be unoccupied for the entire Requested Budget Year, and no utility service is being provided, exclude the previous actual consumption of these units from the appropriate columns on lines 01, 02, and 03. For a project that will be unoccupied for a significant continuous period during the Requested Budget Year, for such reasons as extensive modernization or if the PHA is awaiting a decision on demolition, but some utility service is to be provided, the previous consumption shall be excluded from the appropriate columns on lines 01, 02, and 03, and the estimated consumption of utilities that may be furnished for the Requested Budget Year shall be included in line 08. The number of UMAs shown under column (3) will not be affected. When the reason for this adjustment has passed, then the Rolling Base Period consumption shall once again be entered on lines 01, 02 and 03 for this project in accordance with the instructions "For New Utility" in the third paragraph of this section. The PHA/HA must submit documentation in support of any consumption entered on line 08 pursuant to this paragraph.

Switch of Utilities from Tenant-Purchased to PHA/HA-Supplied. If the PHA/HA has switched from tenant-purchased to PHA/HA-supplied utilities during the Rolling Base Period or if it has or will do so after the Rolling Base Period but prior to the end of the Requested Budget Year, consumption data applicable to PHA/HA-supplied utilities must be included on the form HUD-52722-A. The instructions contained in the third paragraph of this section, ("For New Utility") are appropriate for the adjustment necessary to reflect this switch. Keep in mind that where the instructions state "new utility" it will mean, for the purposes of this paragraph, the new PHA/HA-supplied utility. In addition, where consumption experience is requested, it relates to experience under a PHA/HA-supplied system and not to previous consumption charged directly to tenants.

Switch of Utilities from PHA/HA-Supplied to Tenant-Purchased. If the PHA/HA has changed from PHA/HA-supplied to tenant-purchased utilities prior to the beginning of the Requested Budget Year, no data regarding PHA/HA-supplied utilities shall be included in the Rolling Base Period (lines 01, 02 and 03) consumption data.

If the switch is to be made in the Requested Budget Year, the amount of PHA/HA-supplied consumption for the period from the beginning of the Requested Budget Year to the date of the switch shall be shown on line 08; do not show UMAs for such units on line 08 since they are already included in lines 01, 02 and 03. The estimate shall be based upon consumption experience of the Rolling Base Period. In the next fiscal year, the partial consumption should be deleted from line 08.

Submission of Form HUD-52722-A. Submit form HUD-52722-A to the Field Office for approval together with form HUD-52723, "Calculation of PFS Operating Subsidy", and the Operating Budget, form HUD-52564, for the Requested Budget Year.

Supporting Documentation. The PHA/HA shall retain supporting documentation substantiating the data reported on this form until audited.

Preparation of form HUD-52722-A for consideration of an Adjustment Due to Rate Increases During a Current Year. Prior to the submission of an adjustment for rate increases for a current year, refer to the provisions of Section 900.110(c) of the PFS regulations to determine if the PHA/HA qualifies for early adjustment.

Lines 01 through 08. Enter the same amounts as shown on lines 01 through 08 of the last previously approved form HUD-52722-A, submitted for the

APPENDIX 10

Current Fiscal Year. These data usually will not be changed since it relates to consumption and UMAs, and adjustments for consumption are not allowed until after the close of the fiscal year. However, if the PHA/IHA has a valid basis for changing the UMAs shown on line 09 of the previously approved form HUD-52722-A, it may do so, but all documents relative to the Performance Funding System must be recalculated and resubmitted.

Line 10. Compute the revised estimated costs attributable to each consumption amount, based on monthly rate schedules or unit prices, and enter in the appropriate column. When a revised form HUD-52722-A is submitted to reflect rate increases implemented in the current fiscal year, the new rate shall only be applied to the consumption of the remaining portion of the current fiscal year. This can be accomplished by using a rate that is a weighted average. For those costs which do not change, enter previously approved amounts.

Line 11. Enter the sum of all columns of line 10.

Line 12. Divide the amount in column (3) of line 11 by UMAs shown in column (3) of line 09. Enter resulting PUM amount here and on the line titled "Allowable Utilities Expense Level" of revised form HUD-52723.

Submission. Submit the revised form HUD-52722-A to the Field Office for approval together with a revised form HUD-52723 and a revised Operating Budget form HUD-52584.

Supporting Documentation. The PHA/IHA shall retain the documentation evidencing the change(s) in utility rate schedules or unit prices until audited.

Adjustment for Utility Consumption and Rates

U.S. Department of Housing and Urban Development
Office of Public and Indian Housing



PHA/HA-Owned Rental Housing Performance Funding System

OMB Approval No. 2577-0029

Public Housing Agency / Indian Housing Authority

Funding

ACC Contact Number

Type of Submission

Original Revision No. ()

HUD Adjustment Factor Applied? Yes No

Fuel Costs & Consumption (Specify type e.g. oil, coal, wood)

Line No.	Description	Totals	Sewerage and Water Cost and Consumption	Electricity Costs and Consumption	Gas Costs and Consumption	(7)	(8)	(9)
	(2)	(3)	(4)	(5)	(6)			
13	Actual utility costs for the fiscal year for which adjustment is requested.							
14	Actual consumption for the fiscal year for which adjustment is requested.							
15	Actual average rate (line 13 divided by line 14).							
16	Estimated consumption for old and new projects for the fiscal year for which adjustment is required.							
17	Costs of estimated consumption at average rate (line 15 times line 16; enter total in column 3).							
18	Line 17, column (3) times 0.50; enter the amount in column 3.							
19	Line 13, column (3) times 0.50; enter the amount in column 3.							
20	Total utility costs includable in Operating Subsidy Calculation (line 18 plus line 19).							
21	Total estimated cost for the fiscal year for which adjustment is requested (line 11, form HUD-52722-A).							
22	Utility adjustment (line 20 minus line 21)							

Previous Editions are Obsolete

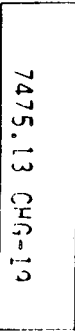
form HUD-52722-B (4/88)
ref. handbook 7475.13

D-6

5/88



PERFORMANCE FUNDING SYSTEM HANDBOOK



APPENDIX 11

7475.13 CHG-19

APPENDIX 11

Instructions. Note: These instructions apply to PHA/HA fiscal years ending December 31, 1983 and thereafter.

1. General. This form is an extension of form HUD-S2722-A, "Calculation of Allowable Utilities Expense Level", and is used to adjust the estimated PUM cost of consumption for actual rates, consumption and heating degree days (HDD) experienced for the fiscal year for which the form HUD-S2722-A was prepared. A copy of this form must be prepared and submitted by each PHA/HA, by ACC, for each PHA/HA fiscal year for which the PHA/HA received approval of an operating subsidy, except where the subsidy was solely for the cost of an independent audit. A variance of actual rates or consumption from estimates will increase or decrease subsidy eligibility. A revised form HUD-S2723, "Calculation of Performance Funding Operating Subsidy", for the same fiscal year for which the form HUD-S2722-A was prepared, is required in conjunction with this form.

2. Preparation and Submission of this Form. Heading. In the space provided, enter: name of Public Housing Agency or Indian Housing Authority; the fiscal year ending date for which the requested adjustment is being submitted; the Annual Contributions Contract Number; a check (✓) indicating an original submission or a revision and a revision number; and a check (✓) in the appropriate box to indicate whether the estimated consumption on line 16 has been adjusted by the heating degree day (HDD) factor.

Columns 7, 8, 9. Insert in the column headings the same information included on the last HUD-approved form HUD-S2722-A for the fiscal year for which the adjustment is requested.

Line 13. By type of utility, enter the actual total utility costs, in the appropriate columns, for the fiscal year for which the adjustment is requested. The source of the cost data is the form HUD-S2599, "Statement of Operating Receipts and Expenditures", prepared for the fiscal year for which the adjustment is requested. The PHA/HA shall consider the following points prior to entering the costs on this line.

When all projects have been in management for a full 12-month fiscal year, whether the PHA/HA is on a cash or an accrual basis, the costs entered on line 13 must be for a 12-month period to correspond with the estimates originally made on the form HUD-S2722-A. If any utility costs reported on the form HUD-S2599 are not for a 12-month period, adjustment of costs to a 12-month period must be made and documentation must be submitted supporting the adjustment.

When all or some of the projects have been in management for less than or more than 12 months, the costs entered on this line shall be those costs incurred for the projects for the number of unit months available (UMAs) reported on the form HUD-S2599, which must be the same as the UMAs entered on line 09, column 3 of form HUD-S2722-A. If the UMAs are different from what was used on the latest approved form HUD-S2722-A, all documents relative to the PFS must be recalculated and resubmitted using the correct UMAs.

Line 14. Enter the actual consumption for the fiscal year for which the adjustment is requested. This will be the consumption relative to the actual total utility costs entered on line 13 above. Refer to the instructions for adjustments of utility rates, consumption and costs which may be required pursuant to instructions for line 13 above.

Line 15. Enter the results of dividing each column of line 13 by the corresponding column of line 14.

Line 16. Enter the estimated consumption for old and new projects for the fiscal year for which the adjustment is requested. These amounts will be the same as those on line 08 of the corresponding form HUD-S2722-A for the fiscal year for which the adjustment is requested, except the AUCL applicable to space heating must be adjusted by a HDD change factor as explained in the following paragraph.

The AUCL of the Rolling Base Period utility(ies) used for space heating (as defined below) shall be adjusted to reflect the ratio of the heating degree days (HDD) of the PHA/HA fiscal year for which this form is prepared to the average annual HDD for its three-year Rolling Base Period. The first PHA/HA fiscal year to which the adjustment (Change Factor) was applicable was the fiscal year ending December 31, 1983. (Reference: PFS Regulations cited at 24 CFR 980.107(d)). The consumption readings of meters of utilities, or gallons of oil, or tons of coal used to heat dwelling units and other PHA/HA buildings shall be adjusted up or down by the Change Factor supplied by HUD. Change Factors are provided for each county of each state by PHA/

HA fiscal year beginning date. The Change Factor shall be applied to the total consumption reading of a meter of a utility, or gallons of oil, or tons of coal, etc., even if the utility measured by the meter is used for other purposes in addition to space heating; e.g., gas used for space heating and cooking measured on the same meter or oil used for space heating and heating water. The appropriate consumption for each fiscal year of the Rolling Base Period (Old Projects) shall be adjusted by the Change Factor. A suggested format to accomplish the adjustment of the Rolling Base Period is included in the paragraph "Supporting Documentation" below. The remaining consumption allowed for the same utility(ies) not used for heating (not adjusted by the Change Factor) shall be included in the total adjusted consumption. After adding the adjusted and nonadjusted consumption for each year, sum these totals for the three years and compute an average adjusted AUCL by dividing the sum by three (3). The Change Factor shall then be applied to the space heating utility(ies) of New Projects in the same manner as described above for Old Projects. The New Project adjusted total shall be added to the average amount determined for the Old Projects and this sum shall be entered on line 16 in the appropriate column. The AUCL of other types of utilities shall be entered in the appropriate columns of this line. If a PHA/HA manages units in more than one county, and these counties have different change factors, the adjustment of the Rolling Base Period consumption shall be computed using a weighted average Change Factor based upon the number of units in each county and each county's Change Factor. If a PHA/HA manages units in an independent city not within the jurisdiction of a county, it shall, (1) if surrounded by one county, use that county's Change Factor, or (2) if surrounded by more than one county, use the average of the Change Factors of the contiguous counties.

Line 17. Multiply the columns of line 15 by the columns of line 16 and enter the results in the appropriate columns of line 17. Sum the amounts of columns 4 through 9 and enter the total in column 3.

Line 18. Multiply the amount on line 17, column 3 by 0.50.

Line 19. Multiply the amount on line 13, column 3 by 0.50.

Line 20. Line 18 plus line 19. This is the amount that will be allowed for utilities costs instead of the utilities costs previously computed on form HUD-S2722-A for the fiscal year for which the adjustment is requested.

Line 21. Enter the total cost that was estimated for the fiscal year for which the adjustment is requested, as shown on line 11 of the latest HUD approved form HUD-S2722-A.

Line 22. Line 20 minus line 21. If line 21 is greater than line 20, enter the difference in brackets. Enter the amount here and on the line titled "Utility Adjustment" of a revised form HUD-S2723 for the fiscal year for which the adjustment is requested.

Submission. Submission of this form to the Field Office Manager normally shall be within 30 days after receipt of the needed HDD Change Factor from HUD.

Supporting Documentation. The PHA/HA shall retain supporting documentation substantiating the data reported on this form and retain the detailed records of consumption until audited. Included in this documentation shall be the calculations supporting the application of the Change Factor pursuant to the instructions for line 16, above. For each type of heating utility, the documentation shall be in a format such as that listed below.

A separate sheet shall be prepared for each utility used for heating and for each 12-month period of the Rolling Base Period. Refer to the PFS regulations (24 CFR 980.107) for an explanation of the application of the Change Factor.

Utilities Consumption Adjustment Format

PHA/HA Name _____
Type of Utility (Gas, Oil, Electricity) _____
12-Month Period Ended _____

Table with 5 columns: Project Number, Meter Number, Consumption, Change Factor, Adjusted Consumption. Formula: Consumption x Change Factor = Adjusted Consumption.

Total Adjusted Consumption _____

APPENDIX E SAMPLE GRAPHS AND TABLES

On the following pages are samples of all tables and graphs produced by the Data Entry and Energy Analysis Worksheets.

Data Entry Worksheet: Description

```

=====
||                PROJECT DESCRIPTION                ||
||Public Housing Agency:                            Berkeley ||
||Project Name:                                     First   ||
||Tenant Type (Senior, Family, Mixed):             Family   ||
||Average Number of Stories per Building:           3       ||
||Total Number of Apartments:                       100     ||
||Total Number of Buildings:                       1       ||
||Conditioned Floor Area (square feet):             100,000 ||
||Year Constructed:                                1970    ||
||Number of Apartments with:                       ||
||    0 Bedrooms (Studio)                          10     ||
||    1 Bedroom                                     70     ||
||    2 Bedrooms                                    20     ||
||    3 Bedrooms                                    0     ||
||    4 Bedrooms                                    0     ||
||    5 Bedrooms or more                           0     ||
||    Average Number of Bedrooms per Apartment =    1.1   ||
=====

```

Data Entry Worksheet: Utility_Units

```

=====
||Berkeley      FUEL AND WATER UNITS & END USES      15-Dec-88 ||
||First                                               ||
||                ACCOUNT/METER                      CONVERSION||
||UTILITY        NUMBER          UNITS              FACTORS  ||
||Oil            9876 gallons #6  0.150000  ||
||Gas            5432 ccf         0.102000  ||
||Elec. Usage    1234 kWh         0.003413  ||
||Elec. Demand   1234 kW         1.000000  ||
||Other          9875 gallons #2  0.139000  ||
||Water          54678 gallons    0.000001  ||
|| (Options for Units: Oil--gallons #2, gallons #4, or gallons #6; ||
|| Gas--ccf, therms; Water--gallons, M gallons, ccf.)           ||
||                                                                ||
||END USES      PRIMARY FUEL    SECONDARY FUEL  ||
||Space Heat    gas             none          (For fuel type, enter oil, ||
||Hot Water     oil             gas           gas, electric, other,    ||
||Cooking       gas             none          or none.)                ||
=====

```

Data Entry Worksheet: Billing_Data

*****TYPE "ALT D" WHEN DONE MONTHLY DATA ENTRY***					ELECTRICITY			
Month/Yr	No. of Available Units	No. of Occupants	Changes Affecting Usage	Electric Begin Date	Usage kWh	Demand kW	Usage Cost	Demand Cost
12 / 85	100	198	comment here:	12 / 2 / 85	60,000	400	\$3,000	\$400
1 / 86	100	198	tracking begun	1 / 3 / 86	60,000	400	\$3,000	\$400
2 / 86	100	198		2 / 4 / 86	60,000	400	\$3,000	\$400
3 / 86	100	198		3 / 5 / 86	60,000	400	\$3,000	\$400
4 / 86	100	198		4 / 3 / 86	60,000	400	\$3,000	\$400
5 / 86	100	198		5 / 3 / 86	60,000	400	\$3,000	\$400
6 / 86	100	198		6 / 4 / 86	60,000	400	\$3,000	\$400
7 / 86	100	198		7 / 3 / 86	60,000	400	\$3,000	\$400
8 / 86	100	198		8 / 5 / 86	60,000	400	\$3,000	\$400
9 / 86	100	198		9 / 4 / 86	60,000	400	\$3,000	\$400
10 / 86	100	198		10 / 3 / 86	60,000	400	\$3,000	\$400
11 / 86	100	198		11 / 6 / 86	60,000	400	\$3,000	\$400
12 / 86	100	198		12 / 5 / 86	60,000	400	\$3,000	\$400

GAS			OIL		
Begin Date	ccf	Cost	Begin Date	gallons	Cost
12 / 5 / 85	10,000	\$6,000	12 / 3 / 85	1,500	\$1,500
1 / 6 / 86	10,000	\$6,000	1 / 2 / 86	1,500	\$1,500
2 / 7 / 86	8,000	\$4,800	2 / 1 / 86	1,500	\$1,500
3 / 8 / 86	6,000	\$3,600	3 / 2 / 86	1,500	\$1,500
4 / 9 / 86	4,500	\$2,700	4 / 3 / 86	1,500	\$1,500
5 / 3 / 86	4,000	\$2,400	5 / 2 / 86	1,500	\$1,500
6 / 7 / 86	3,500	\$2,100	6 / 1 / 86	1,500	\$1,500
7 / 8 / 86	3,500	\$2,100	7 / 2 / 86	1,500	\$1,500
8 / 9 / 86	4,000	\$2,400	8 / 3 / 86	1,500	\$1,500
9 / 8 / 86	4,500	\$2,700	9 / 2 / 86	1,500	\$1,500
10 / 7 / 86	6,000	\$3,600	10 / 1 / 86	1,500	\$1,500
11 / 8 / 86	8,000	\$4,800	11 / 2 / 86	1,500	\$1,500
12 / 9 / 86	10,000	\$6,000	12 / 3 / 86	1,500	\$1,500

OTHER FUEL				WATER & SEWER			
Other				Water		Sewer	
Begin Date	gallons	Cost		Begin Date	gallons	Cost	Cost
12 / 3 / 85	400	\$520		12 / 8 / 85	300,000	\$1,200	\$300
1 / 2 / 86	400	\$520		1 / 7 / 86	300,000	\$1,200	\$300
2 / 1 / 86	400	\$520		2 / 6 / 86	300,000	\$1,200	\$300
3 / 2 / 86	400	\$520		3 / 6 / 86	300,000	\$1,200	\$300
4 / 3 / 86	400	\$520		4 / 7 / 86	300,000	\$1,200	\$300
5 / 2 / 86	400	\$520		5 / 8 / 86	300,000	\$1,200	\$300
6 / 1 / 86	400	\$520		6 / 6 / 86	300,000	\$1,200	\$300
7 / 2 / 86	400	\$520		7 / 7 / 86	300,000	\$1,200	\$300
8 / 3 / 86	400	\$520		8 / 8 / 86	300,000	\$1,200	\$300
9 / 2 / 86	400	\$520		9 / 9 / 86	300,000	\$1,200	\$300
10 / 1 / 86	400	\$520		10 / 7 / 86	300,000	\$1,200	\$300
11 / 2 / 86	400	\$520		11 / 6 / 86	300,000	\$1,200	\$300
12 / 3 / 86	400	\$520		12 / 7 / 86	300,000	\$1,200	\$300

Data Entry Worksheet: Adjusted_Billing

ELECTRICITY								
Month/Yr	No. of Available Units	No. of Occupants	Changes Affecting Usage	Electric Begin Date	Usage MBtus	Demand kW	Usage Cost	Demand Cost
1 / 86	100	198	comment here:	1 / 1 / 86	192	400	\$2,813	\$400
2 / 86	100	198	tracking begun	2 / 1 / 86	209	400	\$3,062	\$400
3 / 86	100	198	0.00	3 / 1 / 86	212	400	\$3,103	\$400
4 / 86	100	198	0.00	4 / 1 / 86	205	400	\$3,010	\$400
5 / 86	100	198	0.00	5 / 1 / 86	193	400	\$2,331	\$400
6 / 86	100	198	0.00	6 / 1 / 86	209	400	\$3,065	\$400
7 / 86	100	198	0.00	7 / 1 / 86	189	400	\$2,764	\$400
8 / 86	100	198	0.00	8 / 1 / 86	202	400	\$2,956	\$400
9 / 86	100	198	0.00	9 / 1 / 86	211	400	\$3,090	\$400
10 / 86	100	198	0.00	10 / 1 / 86	184	400	\$2,691	\$400
11 / 86	100	198	0.00	11 / 1 / 86	206	400	\$3,012	\$400
12 / 86	100	198	0.00	12 / 1 / 86	200	400	\$2,936	\$400

GAS			OIL		
Begin Date	MBtus	Cost	Begin Date	MBtus	Cost
1 / 1 / 86	956	\$5,625	1 / 1 / 86	225	\$1,500
2 / 1 / 86	872	\$5,130	2 / 1 / 86	232	\$1,550
3 / 1 / 86	644	\$3,785	3 / 1 / 86	212	\$1,416
4 / 1 / 86	505	\$2,968	4 / 1 / 86	231	\$1,537
5 / 1 / 86	425	\$2,501	5 / 1 / 86	226	\$1,503
6 / 1 / 86	360	\$2,118	6 / 1 / 86	218	\$1,453
7 / 1 / 86	337	\$1,985	7 / 1 / 86	211	\$1,409
8 / 1 / 86	387	\$2,275	8 / 1 / 86	224	\$1,491
9 / 1 / 86	457	\$2,688	9 / 1 / 86	232	\$1,548
10 / 1 / 86	551	\$3,244	10 / 1 / 86	212	\$1,411
11 / 1 / 86	732	\$4,306	11 / 1 / 86	217	\$1,449
12 / 1 / 86	953	\$5,607	12 / 1 / 86	224	\$1,495

OTHER FUEL			WATER & SEWER			
Other	Other		Water	Water		Sewer
Begin Date	MBtus	Cost	Begin Date	M gallons	Cost	Cost
1 / 1 / 86	56	\$520	1 / 1 / 86	0	\$1,200	\$300
2 / 1 / 86	57	\$537	2 / 1 / 86	0	\$1,267	\$317
3 / 1 / 86	52	\$491	3 / 1 / 86	0	\$1,156	\$289
4 / 1 / 86	57	\$533	4 / 1 / 86	0	\$1,153	\$288
5 / 1 / 86	56	\$521	5 / 1 / 86	0	\$1,221	\$305
6 / 1 / 86	54	\$504	6 / 1 / 86	0	\$1,177	\$294
7 / 1 / 86	52	\$489	7 / 1 / 86	0	\$1,133	\$283
8 / 1 / 86	55	\$517	8 / 1 / 86	0	\$1,125	\$281
9 / 1 / 86	57	\$537	9 / 1 / 86	0	\$1,238	\$309
10 / 1 / 86	52	\$489	10 / 1 / 86	0	\$1,219	\$305
11 / 1 / 86	54	\$502	11 / 1 / 86	0	\$1,169	\$292
12 / 1 / 86	55	\$518	12 / 1 / 86	0	\$1,191	\$298

Energy Analysis Worksheet: Begin

```

=====
                          PHA & COMPUTER SET-UP DESCRIPTION
=====
Public Housing Agency Name:                Berkeley
Fiscal Year Start (Jan, Apr, Jul, Oct):    Jan
First year of utility data entered (19__): 86

Path and file name for Energy Analysis Worksheet:
                                          d:\lotus2\kathy\ea\final.wk1

Computer pathname for Data Entry Worksheets:  d:\lotus2\kathy\
      (must end with '\')

Computer pathname for Graph files:          d:\lotus2\kathy\
      (must end with '\')
=====
  
```

Energy Analysis Worksheet: Benchmark

```

=====
                          BENCHMARK COMPARISON
=====
Year of energy use data to compare (19__): 86
Average number of annual heating degree-days: 3600
Three-letter code denoting building characteristics: LCG

-First letter is building type: L(owrise) or H(ighrise)
-Second letter is heating system type: C(entral) or I(individual)
-Third letter is main space heat fuel: G(as), O(il), or E(lectric)

=====
Energy use:                               kBtu/ %
-For your project(s) for specified year:  138 --
-For a similar public housing project:     281 -51%
-For a similar privately owned apartment:  96 44%
      (0 = not available for climate zone & building type specified)
=====
  
```

Energy Analysis Worksheet: Avg_HDD

MONTHLY LONG-TERM AVERAGE HEATING DEGREE-DAYS (calculated at base 65 degrees Fahrenheit)		
(If monthly degree-days=0, enter 1 instead)	January	700
	February	700
	March	500
	April	350
	May	150
	June	50
	July	20
	August	10
	September	20
	October	200
	November	400
	December	500
Annual Average HDD =		3600

Energy Analysis Worksheet: Yearly_HDD

ACTUAL MONTHLY HEATING DEGREE-DAYS BASE 65 F		
Month/Yr	Heating Degree-Days	
1 / 86	700	
2 / 86	700	(If monthly degree-days=0, enter 1 instead)
3 / 86	500	
4 / 86	350	
5 / 86	150	
6 / 86	50	
7 / 86	20	
8 / 86	10	
9 / 86	20	
10 / 86	200	
11 / 86	400	
12 / 86	500	
1 / 87	710	
2 / 87	710	
3 / 87	510	

Energy Analysis Worksheet: Exec_Sum

Berkeley		FY	FY	FY	FY	FY	FY	FY
Number of projects reported here:	1	86	87	88	89	90	91	92
EXECUTIVE SUMMARY (per available unit per month):								
1. UTILITY COSTS (\$/apt-month)		\$103	\$110	\$119	\$131	\$138	\$151	\$160
Percentage change from last year		---	6.56%	8.05%	10.26%	4.84%	9.95%	5.65%
2. UTILITY ROLLING BASE (\$/apt-month)		---	---	---	\$111	\$120	\$129	\$140
Percentage change from last year		---	---	---	---	8.38%	7.61%	8.32%
3. ENERGY COSTS (\$/apt-month)		\$89	\$94	\$100	\$110	\$115	\$126	\$133
Percentage change from last year		---	6.07%	5.94%	10.63%	4.54%	9.28%	5.85%
4. ENERGY USE (MBtu/apt-month)		10.76	11.27	11.32	11.62	11.73	12.11	12.77
Percentage change from last year		---	4.72%	0.48%	2.63%	0.89%	3.26%	5.46%
5. WEATHER-ADJUSTED ENERGY USE (MBtu/apt-month)		10.76	11.16	11.49	11.62	11.64	12.32	12.99
Percentage change from last year		---	3.70%	2.96%	1.15%	0.18%	5.85%	5.38%
6. WATER CONSUMPTION (M gallons/apt-month)		0.0030	0.0033	0.0035	0.0035	0.0036	0.0036	0.0038
Percentage change from last year		---	9.49%	8.03%	0.49%	1.17%	2.20%	4.69%
Number of unit-months available (UMA)		1,200	1,178	1,176	1,186	1,188	1,182	1,164
Heating degree-days in fiscal year		3,600	3,720	3,485	3,600	3,720	3,485	3,485

Energy Analysis Worksheet: Prices

Berkeley		FY	FY	FY	FY	FY	FY	FY
Number of projects reported here:	1	86	87	88	89	90	91	92
AVERAGE UTILITY PRICES:								
Average Electricity Demand Price (\$/kW)		\$1.00	\$1.00	\$1.00	\$1.92	\$2.00	\$2.00	\$2.00
Average Electricity Usage Price (\$/kWh)		\$0.05	\$0.05	\$0.05	\$0.06	\$0.06	\$0.07	\$0.07
Average Gas Price (\$/MBtu)		\$5.88	\$6.05	\$5.92	\$6.08	\$6.37	\$6.15	\$6.16
Average Oil Price (\$/MBtu)		\$6.67	\$6.78	\$7.00	\$7.02	\$7.20	\$7.20	\$7.20
Average Other Fuel Price (\$/MBtu)		\$9.35	\$9.35	\$9.59	\$9.73	\$9.93	\$9.99	\$10.07
Average Water & Sewer Price (\$/gallon)		\$0.005	\$0.005	\$0.006	\$0.006	\$0.006	\$0.007	\$0.007

Energy Analysis Worksheet: Total_Annual

Berkeley	FY	FY	FY	FY	FY	FY	FY
Number of projects reported here:	86	87	88	89	90	91	92
ANNUAL UTILITY CONSUMPTION--total:							
Maximum Annual Electricity Demand (kW)	400	400	400	400	400	400	400
Electricity Usage(weather-adjusted MBtu/year)	2,412	2,507	2,629	2,849	2,888	3,029	3,205
Natural Gas (weather-adjusted MBtu/year)	7,180	7,197	7,392	7,274	7,150	7,503	7,724
Oil (weather-adjusted MBtu/year)	2,664	2,783	2,834	3,002	3,136	3,377	3,530
Other (weather-adjusted MBtu/year)	658	659	657	658	659	659	660
TOTAL ENERGY USE (weather-adjusted MBtu/year)	12,914	13,146	13,512	13,784	13,832	14,568	15,118
TOTAL WATER USE (M gallons/year)	3.56	3.83	4.13	4.18	4.24	4.31	4.45
ANNUAL UTILITY COSTS--total:							
Electricity Demand (\$/year)	\$4,800	\$4,800	\$4,800	\$9,200	\$9,600	\$9,600	\$9,600
Electricity Usage (\$/year)	\$35,332	\$37,317	\$42,367	\$49,708	\$52,462	\$62,009	\$65,729
Gas (\$/year)	\$42,233	\$43,529	\$43,750	\$44,215	\$45,571	\$46,178	\$47,590
Oil (\$/year)	\$17,762	\$18,863	\$19,839	\$21,062	\$22,579	\$24,318	\$25,416
Other (\$/year)	\$6,158	\$6,162	\$6,296	\$6,405	\$6,537	\$6,590	\$6,647
TOTAL ENERGY COSTS (\$/year)	\$106,285	\$110,671	\$117,051	\$130,590	\$136,748	\$148,686	\$154,982
Water (\$/year)	\$14,250	\$15,316	\$17,681	\$18,832	\$19,743	\$21,562	\$22,230
Sewer (\$/year)	\$3,562	\$3,829	\$5,293	\$6,277	\$7,020	\$8,625	\$8,892
TOTAL WATER COSTS (\$/year)	\$17,812	\$19,145	\$22,974	\$25,110	\$26,763	\$30,187	\$31,122
TOTAL UTILITY COSTS (\$/year)	\$124,097	\$129,817	\$140,025	\$155,700	\$163,511	\$178,873	\$186,104

Energy Analysis Worksheet: Sqft_Annual

Berkeley	FY	FY	FY	FY	FY	FY	FY
Number of projects reported here:	86	87	88	89	90	91	92
ANNUAL UTILITY CONSUMPTION--per square foot:							
Maximum Annual Electricity Demand (W/sqft)	4	4	4	4	4	4	4
Electricity Usage(weather-adj kBtu/sqft-year)	24	25	26	28	29	30	32
Natural Gas (weather-adjusted kBtu/sqft-year)	72	72	74	73	71	75	77
Oil (weather-adjusted kBtu/sqft-year)	27	28	28	30	31	34	35
Other (weather-adjusted kBtu/sqft-year)	7	7	7	7	7	7	7
TOTAL ENERGY USE (weather-adj kBtu/sqft-year)	129	131	135	138	138	146	151
TOTAL WATER USE (gallons/sqft-year)	36	38	41	42	42	43	44
ANNUAL UTILITY COSTS--per square foot:							
Electricity Demand (\$/sqft-year)	\$0.05	\$0.05	\$0.05	\$0.09	\$0.10	\$0.10	\$0.10
Electricity Usage (\$/sqft-year)	\$0.35	\$0.37	\$0.42	\$0.50	\$0.52	\$0.62	\$0.66
Gas (\$/sqft-year)	\$0.42	\$0.44	\$0.44	\$0.44	\$0.46	\$0.46	\$0.48
Oil (\$/sqft-year)	\$0.18	\$0.19	\$0.20	\$0.21	\$0.23	\$0.24	\$0.25
Other (\$/sqft-year)	\$0.06	\$0.06	\$0.06	\$0.06	\$0.07	\$0.07	\$0.07
TOTAL ENERGY COSTS (\$/sqft-year)	\$1.06	\$1.11	\$1.17	\$1.31	\$1.37	\$1.49	\$1.55
Water (\$/sqft-year)	\$0.14	\$0.15	\$0.18	\$0.19	\$0.20	\$0.22	\$0.22
Sewer (\$/sqft-year)	\$0.04	\$0.04	\$0.05	\$0.06	\$0.07	\$0.09	\$0.09
TOTAL WATER COSTS (\$/sqft-year)	\$0.18	\$0.19	\$0.23	\$0.25	\$0.27	\$0.30	\$0.31
TOTAL UTILITY COSTS (\$/sqft-year)	\$1.24	\$1.30	\$1.40	\$1.56	\$1.64	\$1.79	\$1.86

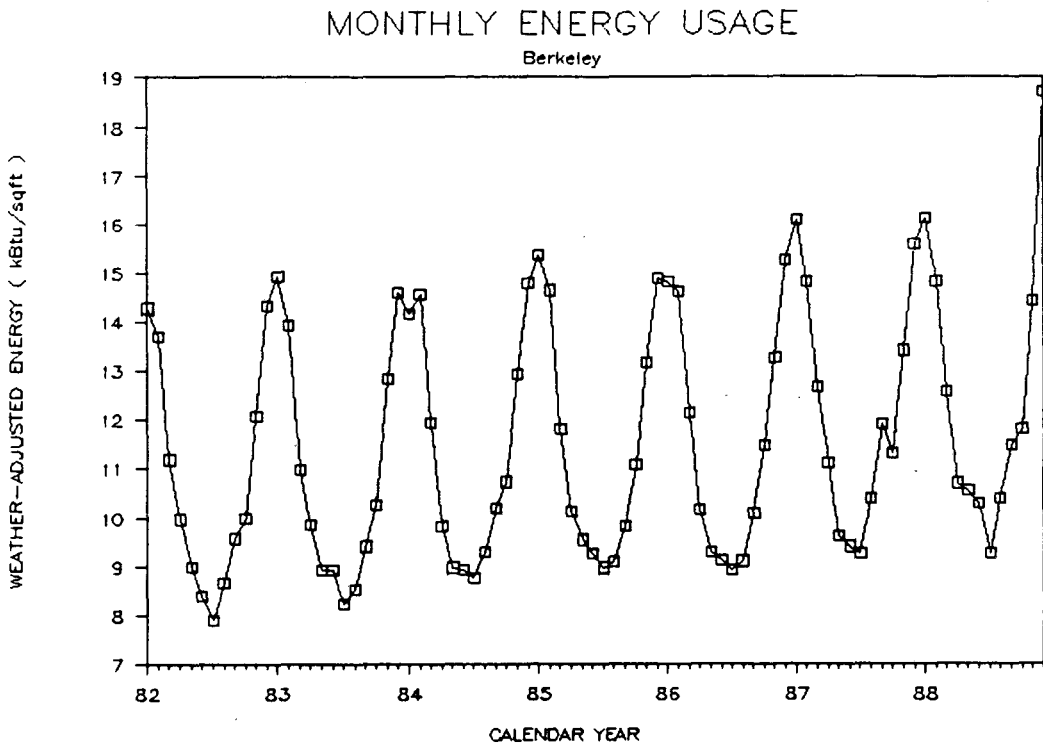
Energy Analysis Worksheet: First_PFS_Form(52722A)

Replica of form HUD-52722A MODIFIED (4/88) OMB Approval No. 2577-0029		OLD PROJECT NUMBERS: (Data on lines 1,2,3)	NEW PROJECT NOS: (Data on line 8)	FISCAL YR ENDING: Dec. 31, 1991					
PHA/IHA-OWNED RENTAL HOUSING PERFORMANCE FUNDING SYSTEM									
Calculation of Allowable Utilities Expense Level		Original: No	Revision#: 2	AC CONTRACT NUMBER: test					
PUBLIC HOUSING AGENCY/INDIAN HOUSING AUTHORITY									
Berkeley									
LINE NO.	DESCRIPTION	UNIT MONTHS AVAILABLE	SEWERAGE AND WATER CONSUMPTION	ELEC-TRICITY CONSUMPTION	GAS CONSUMPTION	OIL CONSUMPTION	FIRST FUEL (Specify Other)	SECOND FUEL (Specify none)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
01	UMA and Actual Consumption for Old Projects for Twelve-Month Period Which Ended Twelve Months Before the Requested Budget Year	1182	4.31	3029	7246	3377	659	0	
02	UMA and Actual Consumption for Old Projects for Twelve-Month Period Which Ended Twenty-four Months Before the Requested Budget Year	1188	4.24	2888	7247	3136	658	0	
03	UMA and Actual Consumption for Old Projects for Twelve-Month Period Which Ended Thirty-six Months Before the Requested Budget Year	1186	4.18	2849	7274	3002	658	0	
04	Accumulated UMA and Actual Consumption of Old Projects (Sum of Lines 01, 02 and 03)	3556	12.74	8766	21768	9516	1975	0	
05	Estimated Unit Months Available for Old Projects for Requested Budget year	1200	#####						
06	Ratio of Unit Months Available for Old Projects (Line 04 divided by Line 05 of Column 3)	3	#####						
07	Estimated UMA and Consumption for Old Projects for Requested Budget Year (Each figure on line 04 divided by line 06)	1200	4.30	2958	7346	3211	667	0	
08	Estimated UMA and Consumption for New Projects	0	0.00	0	0	0	0	0	
09	Total Estimated UMA and Consumption for Old and New Projects for Requested Budget Year (lines 07 + 08)	1200	4.30	2958	7346	3211	667	0	
10	Estimated Cost of Consumption on Line 09 for Requested Budget Year	Costs	20000	42420	44052	20320	6000	0	
11	Total Estimated Cost for Requested Budget Year (Sum of all Columns of Line 10)	132792	#####						
12	Estimated PUM Cost of Consumption for Requested Budget Year (Allowable Utilities Expense Level) (Line 11 divided by line 09, col. 3)	111	#####						
12a	Rate	#####	\$4,653	\$14.34	\$6.00	\$6.33	\$9.00	NA	
12b	Unit of Consumption	#####	M gallon site	MBtu	MBtu	MBtu	MBtu	MBtu	

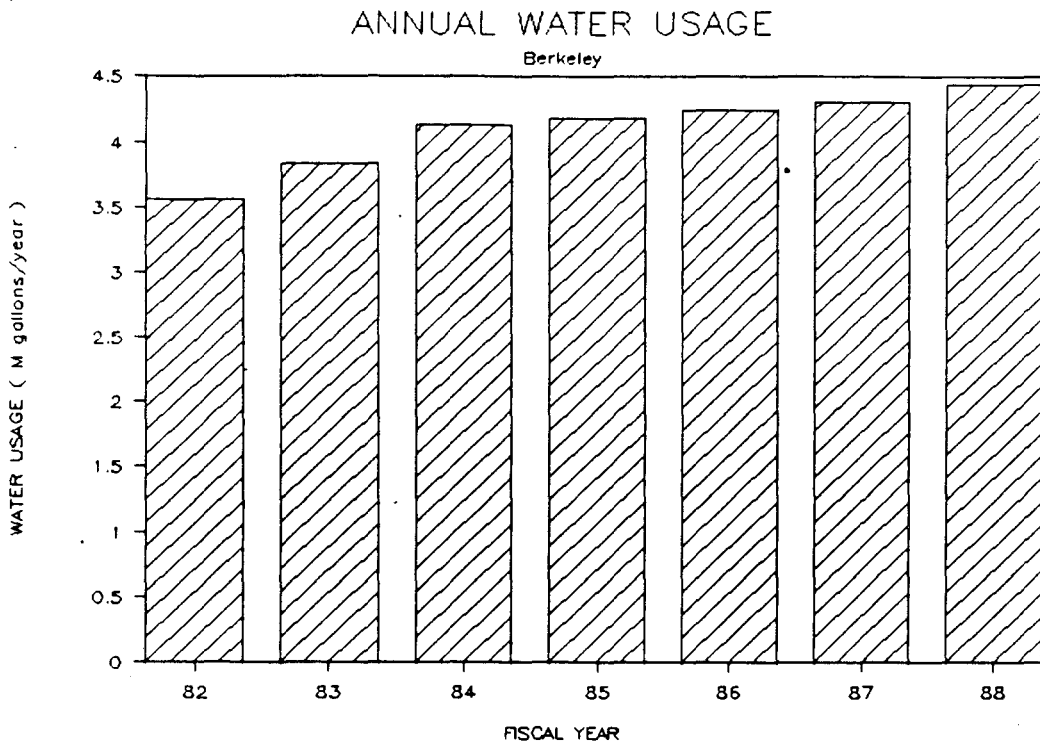
Energy Analysis Worksheet: Second_PFS_Form(52722B)

Replica of form HUD-52722B (4/88)		HDD Adjustment Factor Applied? Yes/No					FISCAL YR	
OMB Approval No. 2577-0029							ENDING:	
							Dec. 31,	
PHA/IHA-OWNED RENTAL HOUSING PERFORMANCE FUNDING SYSTEM							1988	
Adjustment for Utility Consumption and Rates		Original: No	Revision#:	2	AC CONTRACT NUMBER: test			
PUBLIC HOUSING AGENCY/INDIAN HOUSING AUTHORITY		SEWERAGE ELEC-						
Berkeley		AND WATER TRICITY GAS OIL FIRST SECOND						
		COSTS AND COSTS AND COSTS AND COSTS AND FUEL FUEL						
LINE	DESCRIPTION	TOTAL	CONSUMP- TION	CONSUMP- TION	CONSUMP- TION	CONSUMP- TION	(Specify) Other	(Specify) none
NO.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) (9)
13	Actual utility costs for the fiscal year for which adjustment is requested	135225	22974	42367	43750	19839	6296	0
14	Actual consumption for the fiscal year for which adjustment is requested	#####	4.13	2629	7198	2834	657	0
15	Actual average rate (Line 13 divided by line 14)	#####	5563	16.11	6.08	7.00	9.59	0.00
16	Estimated consumption for old and new projects for the fiscal year for which adjustment is required	#####	4.50	3000	7000	3200	600	0
17	Costs of estimated consumption at average rate (Line 15 times line 16; enter total in col. 3)	144082	25034	48345	42549	22400	5754	0
18	Line 17, column (3) times 0.50; enter the amount in column 3.	72041	#####	#####	#####	#####	#####	#####
19	Line 13, column (3) times 0.50; enter the amount in column 3.	67612	#####	#####	#####	#####	#####	#####
20	Total utility costs includable in Operating Subsidy Calculation (line 18 plus line 19)	139653	#####	#####	#####	#####	#####	#####
21	Total estimated cost for the fiscal year for which adjustment is requested (line 11, form HUD-52722-A)	155933	#####	#####	#####	#####	#####	#####
22	Utility adjustment (line 20 minus line 21)	-16280	#####	#####	#####	#####	#####	#####

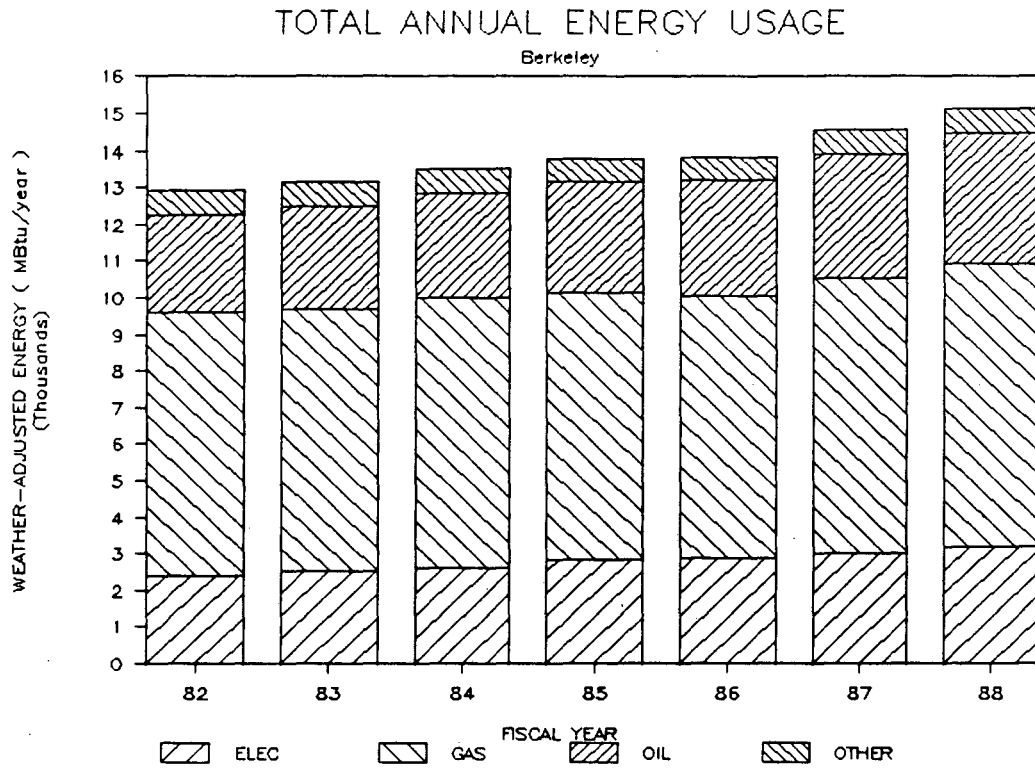
Energy Analysis Worksheet: Graph 1--Monthly Energy Usage



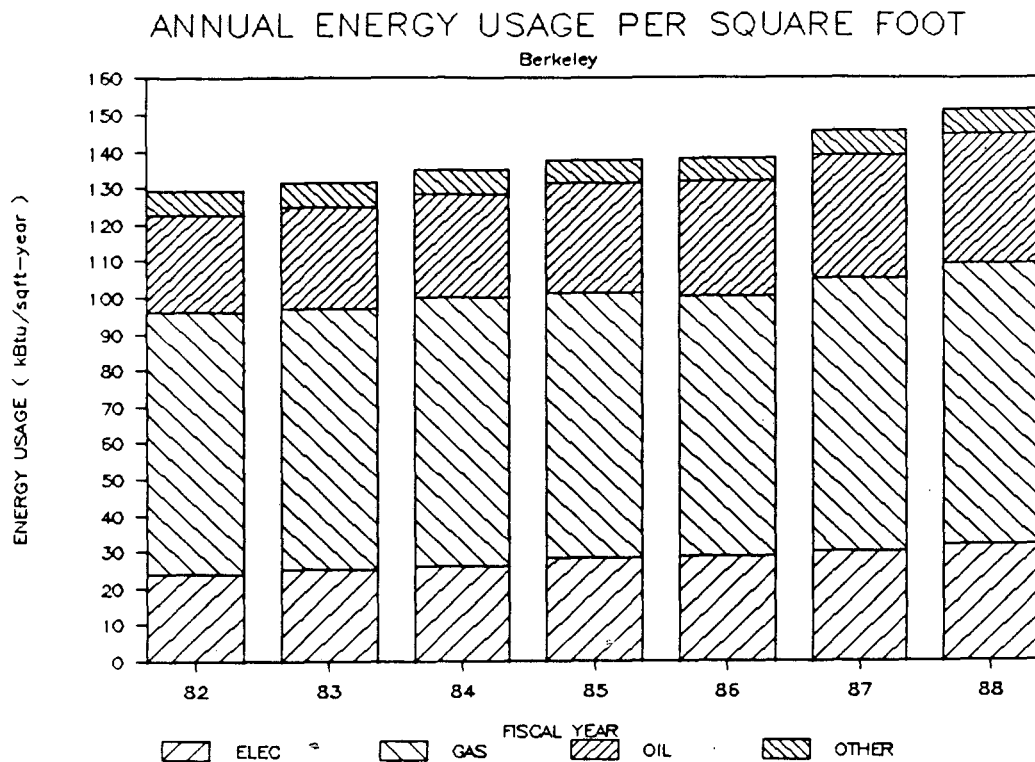
Energy Analysis Worksheet: Graph 2--Annual Water Usage



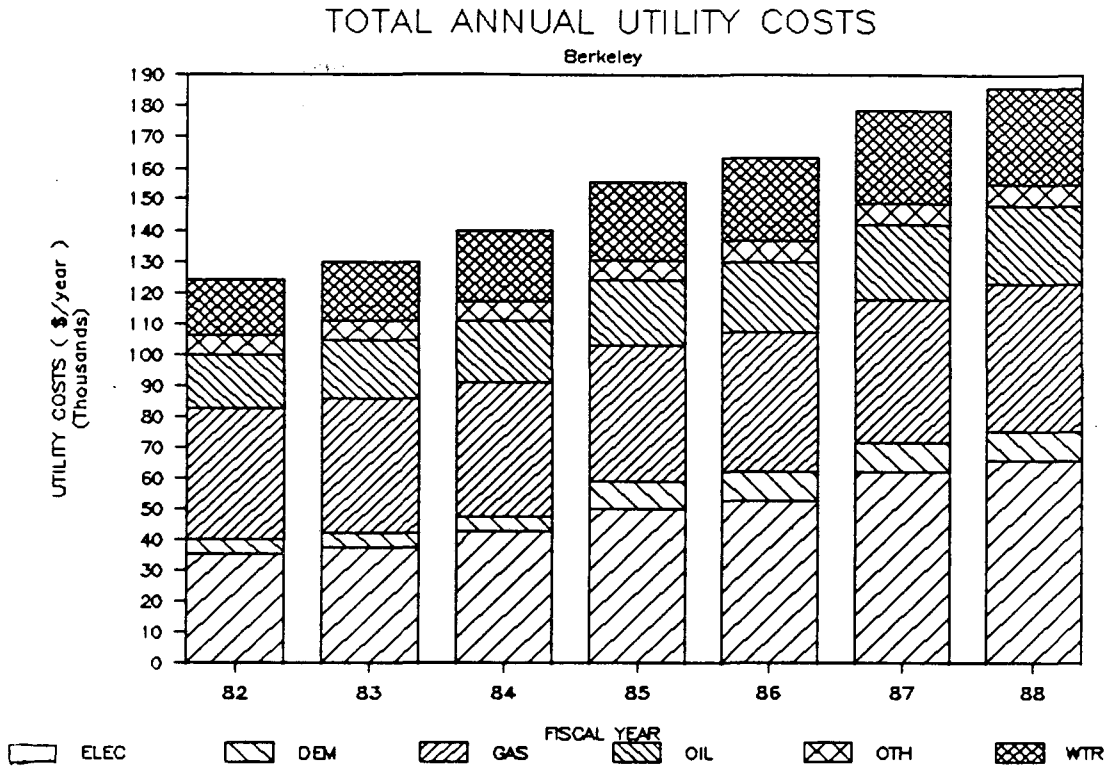
Energy Analysis Worksheet: Graph 3--Total Annual Energy Usage



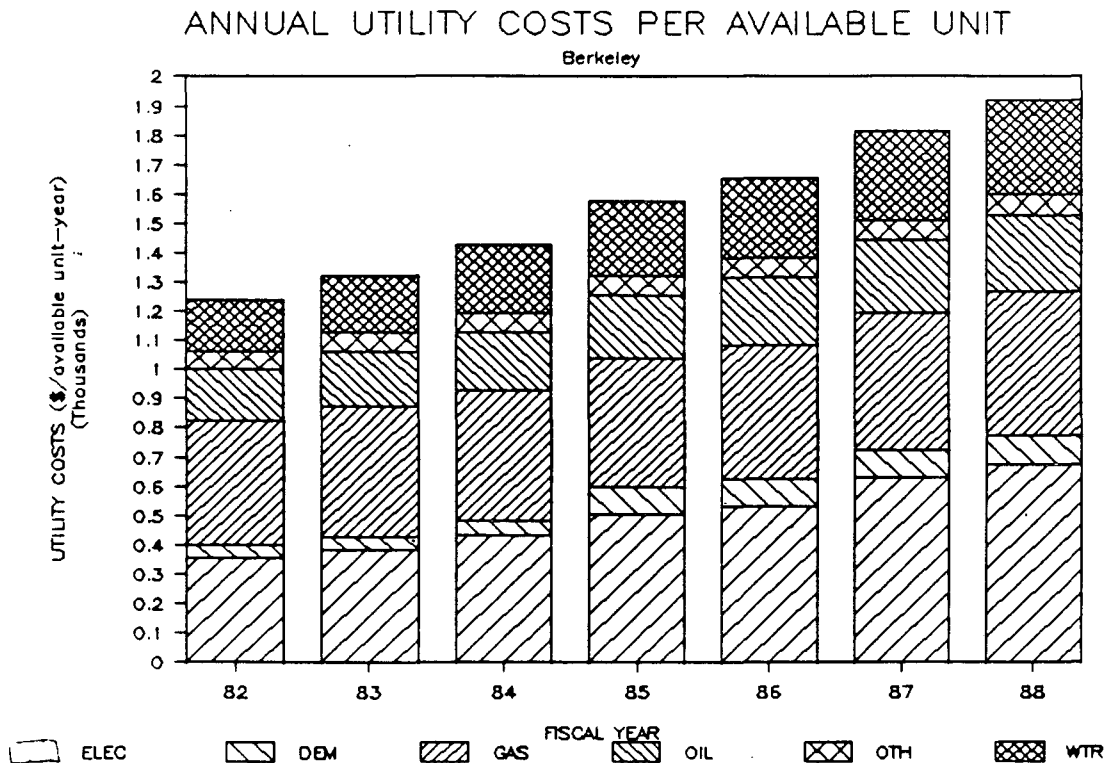
Energy Analysis Worksheet: Graph 4--Annual Energy Usage per Square Foot



Energy Analysis Worksheet: Graph 5--Total Annual Utility Costs



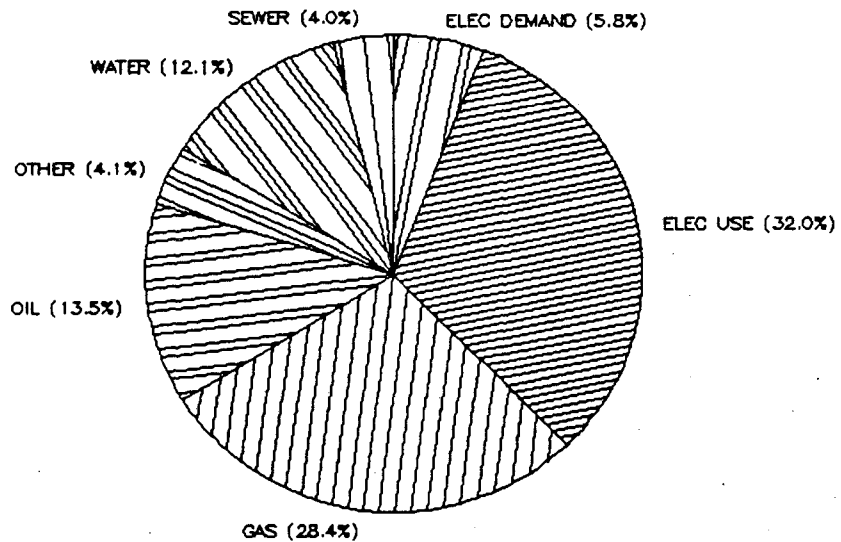
Energy Analysis Worksheet: Graph 6--Annual Utility Costs per Available Unit



Energy Analysis Worksheet: Graph 7--Annual Utility Costs

ANNUAL UTILITY COSTS

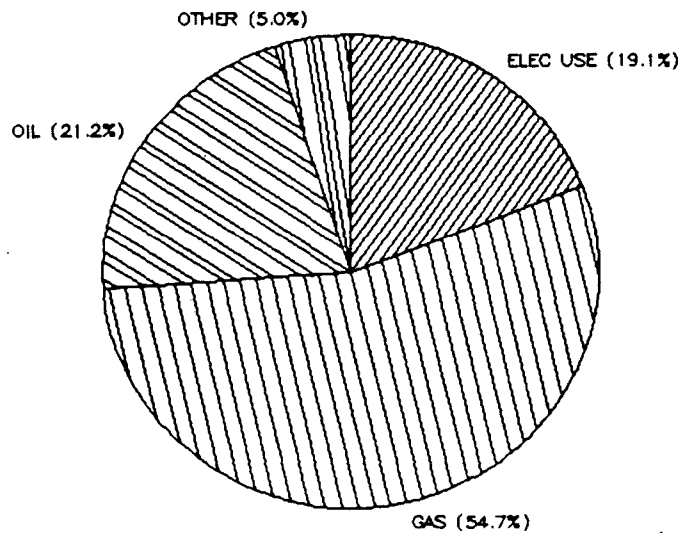
1985



Energy Analysis Worksheet: Graph 8--Annual Energy Usage

ANNUAL ENERGY USAGE

1983



APPENDIX F USER SUPPORT

This appendix contains information on registering as a Utility Accounting Package user, where to go with questions or problems concerning the UAP, and how to obtain additional copies of the UAP and manual.

- Please register using the "User Registration Form" on page F-2. By registering as a UAP user, you will be sure to receive future updates of the program and its documentation.
- Use the "UAP Problem Report" on page F-3 to report software bugs or documentation errors. Please be sure that any errors that you report are *reproducible*.
- Additional copies of the Utility Accounting Package are available to public housing agencies, multifamily building owners and managers, and other interested parties, at a cost of approximately \$20. (Please contact HUD User for current cost information.)

Contact:

HUD User
P.O. Box 6091
Rockville MD 20850
1 (800) 245-2691
(301) 251-5154 in Maryland and the District of Columbia

If you have any other problems or questions, please contact:

William Freeborne
U.S. Department of Housing and Urban Development
451 Seventh St. SW
Room 8230
Washington DC 20410
(202) 755-5528 or FTS 755-5528

USER REGISTRATION FORM

Name: _____

Position: _____

Organization: _____

Address: _____

City, State, ZIP: _____

Phone: () _____

Date: _____

Size of Housing Authority:

- Number of Projects: _____

- Number of Dwelling Units: _____

Previous energy tracking method:

- None _____ - PC Program (specify) _____

- Hand _____ - Mainframe Program (specify) _____

Send completed user registration form to:

William Freeborne
U.S. Department of Housing and Urban Development
451 Seventh St. SW
Room 8230
Washington DC 20410

UTILITY ACCOUNTING PACKAGE PROBLEM REPORT

Name: _____

Position: _____

Organization: _____

Address: _____

City, State, ZIP: _____

Phone: () _____

Date: _____

Software Description:

- UAP Version Number: _____

- Lotus 1-2-3 Version Number: _____

- MS-DOS Version Number: _____

Computer type:

- Manufacturer _____

- Memory _____ kBytes

- Hard disk or floppies only? _____

Describe the problem, including how to reproduce it, and suggestions for correction:

Send completed problem report to:

William Freeborne
U.S. Department of Housing and Urban Development
451 Seventh St. SW
Room 8230
Washington DC 20410

APPENDIX G GLOSSARY OF TERMS

available unit: A dwelling unit is considered available for occupancy from the date on which the End of Initial Operating Period (EIOP) for the project is established until the time the project or unit is approved by HUD for (1) deprogramming (and is vacated) or (2) non-dwelling use.

Btu: British thermal unit, which is a unit of energy consumption.

ccf: Hundreds of cubic feet, which is a measure of energy consumption, equivalent to 102,000 Btu.

conditioned floor area: Floor area of a building which is either heated and/or cooled.

gallon: A unit of oil or water consumption.

gallon #2: A type of heating oil, equivalent to 139,000 Btu.

gallon #4: A type of heating oil, equivalent to 145,000 Btu.

gallon #6: A type of heating oil, equivalent to 150,000 Btu.

HDD adjustment factor: A yearly number, provided by HUD to each PHA, which is used to adjust energy consumption during the rolling base period for changes in the severity of the weather between the current year and the rolling base period.

HDD change factor: See HDD adjustment factor.

heating degree day (HDD): A measure of the severity of the weather during a given period. The heating degree-day base 65°F refers to the number of degrees per day the average temperature is below 65°F.

kBtu: Thousands of British thermal units.

kW: Kilowatt, which is a unit of demand or power (the rate at which electricity is consumed).

kWh: Kilowatt-hour, which is a unit of electricity consumption.

long-term average HDD: The number of heating degree-days for a given period, averaged over thirty years. It is used to approximate the typical weather for a region, for comparison with year-to-year variations in the actual number of heating degree-days.

master-metered: A configuration in which the energy consumption of two or more households is measured with one utility meter and receives one utility bill.

MBtu: Millions of British thermal units.

Mcf: Millions of cubic feet.

M gallons: Millions of gallons.

performance funding system (PFS): A system set up by HUD for, among other things, calculating how much of a PHA's utility costs will be subsidized by HUD.

project: One or more buildings within a public housing agency, which are located at one site and administered as one unit.

rolling base period: A three-year period prior to the current year, which is used by HUD as a period of "baseline" energy consumption.

site energy: The conversion of electricity usage (in kWh) to Btu, where 3,413 Btu = 1 kWh.

therm: A unit of natural gas consumption, equivalent to 100,000 Btu.

unit: A dwelling unit for a single household. In multifamily buildings, a unit is equivalent to an apartment; in single family buildings, a unit refers to a house.

unit months available (UMA): The product of project units multiplied by the number of months the units are available for occupancy during the subject fiscal year. (See available unit.)

LAWRENCE BERKELEY LABORATORY
TECHNICAL INFORMATION DEPARTMENT
1 CYCLOTRON ROAD
BERKELEY, CALIFORNIA 94720