



## **Residential Energy Consumption Survey (RECS)**

### **User's Guide**

This guide offers an introduction to, and basic instruction of the CLASP Residential Energy Consumption Survey (RECS) spreadsheet tool. It is an aid in proper usage of the CLASP RECS tool meant to facilitate accurate use of the survey and result in high quality data collection and outputs.

#### **I. Background**

A survey of households that targets information about the ownership and use patterns of energy consuming products, is an important tool in assessing the potential impacts of any appliance energy efficiency project. Surveys of this type have been successfully used throughout the world to provide data with which technical experts can present policymakers with reliable estimates of costs and benefits of an energy efficiency program. In addition, such analysis can offer governments and utilities important insights regarding the overall energy consumption patterns of households and businesses. The survey covers a variety of products, which in most cases will account for the bulk of energy consumption in the residence. The general areas of data covered are ownership data, use pattern data and market data.

##### **A. Ownership Data**

Ownership data gives the policy maker an estimate of the scope of impact of any policy affecting a particular product. This includes policies that vary by product class. For example, in a country considering implementing or strengthening energy efficiency standards for frost-free refrigerators, the survey will yield the ownership rate of this class of equipment, as opposed to direct-cool (manual or semi-automatic defrost) refrigerators. The distribution of ownership of certain product classes, in conjunction with an assessment of the age of these products, may also be sufficient to give policymakers a qualitative picture of current trends in product purchases. In order to ensure that ownership rates generated by the survey can be used to determine total energy and financial impacts of a given policy option, care must be taken to ensure that the household sample is representative of the area (country or state) to be affected by the policy. The sample should therefore be designed to reflect the overall distribution of income and level of urbanization, as well as consist of a large enough sample to ensure statistical significance for each parameter studied.

## **B. Usage Data**

The second purpose of the survey is to assess the energy consumption of a particular appliance, or for the household as a whole. If all the questions asked by the survey are completed, the survey can be used to produce a fairly accurate picture of consumption. Since consumer use patterns are highly variable, such a survey is generally the only way to reliably access this type of information. Obtaining product use information requires a significant amount of the household member's time during the interview, but is well worth it. In the case of lighting fixtures, for example, a reliable energy consumption measurement requires that the number of use hours per day for each fixture be obtained by the surveyors. In the case of air conditioners, a variation in seasonal use is particularly important – therefore the number of months used each year is an important parameter for this product.

## **C. Market Data**

Finally, the survey provides market information for key appliances. In particular, brand and model names are included for compact fluorescent lamps, heating, air conditioning and refrigeration equipment, as well as storage tank water heaters. Brand and model number data provide an important indication of the efficiency of products currently in homes.. Approximate retail prices are gathered for key products.

## **II. Surveyor Training**

Though the survey forms may appear straightforward, there are some key preparations that are best considered before sending the surveyors into the field.

- In order to ensure consistency of the data gathered, the surveyors should be trained together as a group. The training team should include an expert in the design and implementation of energy consumption surveys and a survey coordinator fluent in the local language.
- Typically, the training period will require four days.
  - The first two days are devoted to a short course in energy efficiency and energy terminology and a detailed review of the survey questions.
  - The third day is devoted to performing practice surveys of representative residences.
  - The fourth day is devoted to reviewing the results of the practice surveys.
- A brief lesson in lighting should include samples of each of the different technologies, industry-specific terminology (e.g. lamp versus bulb), and how to read labels to determine wattage. Similar brief lessons should be

- given for all of the technologies (air-conditioning, heating, refrigeration, cooking, etc.)
- The interview conducted by the surveyor provides the opportunity to share information related to energy efficiency, which provides the person interviewed with some benefit and further engages him or her in the process. Some energy management tips that can be passed on to the residents should be included. For example;
    - How to select a CFL.
    - How to limit the use of electric resistance heat with heat pumps.
    - Is a freezer more efficient when it is half-empty or completely full?
    - How can you tell if the gasket on a refrigerator needs to be replaced?
  - Surveyors should be taught how to measure their pace and how to pace off the exterior length and width of a residence to approximate the area of the space being surveyed.
  - Whenever possible, surveyors should be encouraged to perform their first post-training surveys in pairs and discuss the experiences before moving on to independent implementation. This will enable them to learn from each other as they gain confidence.

### **III. Using the spreadsheet**

The spreadsheet is designed for two related functions. First, each sheet is formatted such that a complete survey form can be obtained by printing out the entire Excel workbook. Second, once the survey form is filled out by hand on the printed survey form with all response fields completed, responses can be copied directly back into the appropriate worksheet cells. The spreadsheet uses an automated process to transfer these data into a summary sheet that collects data for the entire household sample.

#### **A. Opening the spreadsheet**

The spreadsheet uses macros for user customization and data entry. Therefore, upon opening the spreadsheet, the 'Enable Macros' option should be selected.

#### **B. Application version**

The spreadsheet is designed for use with Microsoft Excel 97-2002 and Excel 5.0/95 versions only. Some features may be lost with earlier versions of Excel.

#### **C. User switches**

The spreadsheet uses two switches to be selected by the user:

#### 1. Full Survey / Short Survey Switch

The survey coordinator has the choice to select between two versions of the spreadsheets: the Full Survey and the Short Survey. The Short Survey is provided in order to minimize the time allocated to each interview. The Short Survey is identical to the Full Survey except that some questions are excluded. These questions are marked throughout the RECS spreadsheets in yellow. If the spreadsheet user selects the Short Survey option, only those questions marked in green will appear on the survey form printout. The short version of the survey will require 20 to 40 minutes to complete, depending on the number of appliances in the household. The full version of the survey contains details about model and price for key appliances, and will take about 10 extra minutes. Use of the full survey is recommended if at all possible, since the questions excluded by the Short Survey provide details which may be necessary to adequately characterize the use of key products.

#### 2. Print Survey/Data Entry Switch

This switch controls whether the spreadsheet is to be used to print data, or to enter collected data. For each survey sheet, there is a corresponding data sheet to store collected survey results. When the 'Print Survey' option is selected, data sheets are hidden and not printed.

### D. Data Entry Process

The survey form is designed so that it may be printed directly from the spreadsheet, with a copy made for each interview. This allows the surveyor to enter respondents' answers directly onto the printed form, resulting in one completed form for each household. These responses can then be copied directly into the spreadsheet and collected with the following steps:

#### 1. Erase previous entries

If the spreadsheet contains responses from a previous household (blue cells), the entries of these cells must be cleared. This is done by clicking the **Clear Data** button. Upon clearing data from the previous household, the household number will increment.

#### 2. Enter new results

Copy responses from hardcopy survey form into the corresponding blue cells of each worksheet.

#### 3. Save data

This is accomplished by clicking the 'Save Data' button on the 'Cover' worksheet. The survey record number will update, and data from each survey worksheet will be copied into its corresponding data worksheet.

#### 4. Check Results

Once responses are copied to data worksheets, check that datasheets contain the correct information for the current household. If a correction is necessary, changes should be made to the survey worksheet and **Save Data** should be clicked again. This will overwrite the previous entries for this household.

5. Repeat steps 1-4 for each household.

### **IV. Sheet Detail**

#### **A. Household**

Questions pertaining to the household and person interviewed – This includes identification of the person interviewed, the number and age distribution of occupants, and the income level. Income level is an important determinant in ownership of major appliances. Therefore, policymakers should take this into account, particularly in developing countries, where appliance ownership may be rapidly increasing. Monthly household income is given in terms of broad (quintile) categories, in order to protect the privacy of the occupants, who may be reluctant to give specific data pertaining to their income. The actual monetary ranges corresponding to each category will be different for each country, and should be calculated and provided to the surveyors during training in the form of country appropriate ranges and be entered into the worksheet.

#### **B. Lighting**

Detailed information about each lighting fixture in each room, or in each exterior area, including number of lamps, bulb type, wattage and usage (hours per day) is used to calculate lighting usage by room type and by lamp technology.

The number of lamps on each line will be multiplied by the watts per lamp, the hours per day of usage, and the days per year to yield the annual energy for each room by lamp technology.

#### **C. Air Conditioning and Fans**

Information on the type, vintage, brand, model, capacity and usage of all mechanical air conditioning units, and information on type, brand and usage of electric fans.

#### **D. Space Heating**

Information on type, brand and usage of main heating equipment.

**E. Refrigeration**

Information on configuration, brand, price, vintage and use of all refrigerator, refrigerator-freezer or freezer-only units in the building.

**F. Cooking**

Information on type of stove/oven and frequency of meal preparation.

**G. Water**

Information on water usage and water heating and presence, type, brand and age of storage tank water heaters.

**H. Building Envelope**

Information on type and size of household and window type. Question 3 in this section concerns the area of the residence. If the person interviewed knows the area of the residence, it is not necessary to measure the length and the width. Surveyors should be taught how to measure their pace and how to pace off the exterior length and width of a residence to approximate the area where necessary.

**I. Other Appliances**

Information on ownership and use of laundry appliances and dishwashers.

**J. Entertainment**

Information on ownership of televisions, video and audio equipment.

**K. Energy Bills**

Information on monthly total electricity and gas bills, to be provided either by person interviewed, or by utility via correlation with meter number.

**L. Survey Information**

Tracking information of the surveyor and the institution employed to complete the survey. This sheet should be completed by the surveyor and left with the person interviewed.

**You are now ready to go out and collect data!! Good Luck.**