

1. General Background of the Survey

1.1 - Introduction:

As a result of the continuous change in the total consumption pattern of the energy sector and its various components, there appeared an opinion to carry out different studies and surveys of all energy consumption sectors, where as consumption percentages by the different energy sectors was stable in the last years. But various price rise and changing inflation rates year after year brought a deep change to energy consumption and become very hard to have figures and indicators for the consumption rates with out conducting various periodic surveys to the energy-consuming sectors.

In view of the importance of domestic sectors in energy consumption and its significant role to affect the consumption rates, the Department of Statistics decided to conduct a survey on energy consumption in the domestic sector which is carried out for the first time. This study will provide for a comprehensive data base for domestic energy consumption on the national, rural and urban levels. A questionnaire has been designed for this purpose, through which we can identify the role and importance of the domestic sector in energy consumption.

The importance of this survey lies in providing the required data on energy consumption status at homes for heating, cooling, lightening, cooking and other home uses, in addition to the volume of expenditure on energy within these uses, providing some special indicators to the decision takers and policy makers in the public as well as the private sectors in order to develop and uplift this sector.

1.2 Objectives of the Survey:

The main objectives of the Energy at Homes Survey are:

1. To provide part of data to construct tables related the sub-account of energy and added values of energy sector.
2. Provide data on the quantities of energy used, whether from petroleum products or from eclectic power.
3. Provide data on prevailing heating patterns and connecting them with the current changes on fuel prices and electricity.
4. Provide data on operating periods for heating and cooling in summer and winter.
5. Provide data on type and ownership of appliances used at homes and areas of concentration.
6. Provide data on uses of insulators, adopted measures for saving energy consumption and linking it with saving in various energy sources.
7. Provide data on total expenditure on energy materials and distribution by different types of expenditure.
8. Provide data on users of solar energy heaters and its areas of use.
9. Provide data on different uses of energy materials and its concentration areas.

1.3 Survey Coverage:

The survey covers a sample of resident households distributed on all governorates of the kingdom. The period of the survey covers summer and winter seasons between 1/4/2008 to 31/3/2009.

The enumerators have visited the households in the sample and collected data about the household for one time and covered the said period.

1.4 Sample Design:

The energy survey has been conducted by using a sample of households that was drawn by the same method adopted in the design of the Household Income and Expenditure Survey 2008, because its sample size is relatively large which gives a highly accurate data. The two-stages cluster strata sampling method was used in designing the survey sample. In the first stage, a cluster sample was drawn using the sampling method proportionate to size systematically- drawn by considering the number of house holds in each cluster as the weight of the cluster. While, in the second stage, a sample of the targeted households (consisting of 8 households) was drawn.

2. The preparatory Stage

2.1 Survey Main Documents

These documents include the survey questionnaire, the instructions manual for field staff in addition to the office and electronic edit rules. The following is a summary of the most important documents:

A. Survey Questionnaire

The questionnaire were designed in its final form after being tested and reviewed by the concerned staff in order to achieved the survey targets. In that process, the questionnaire has included all information in line with the adopted international methodologies and standards. The following are the main subjects contained in the questionnaire:

- **Identification Data:** The identification data includes geographical data related to governorate, district , sub- district, locality, neighborhood, area, block number, strata, cluster and information on the household itself such as name of the household head, building number and complete household address in addition to phone number (if available).
- **Residence characteristics:** The characteristics include the residence area, old of the residence, material used in the building, location (if it is an apartment, insulated or not, number of the household members and its average monthly income).
- **Electricity – related Data:** To identify whether the building is connected to the national electricity network or not, the electricity bill value at summer and winter, the type of lighting in the residence and hours of operation in the two seasons.

- **The Used Heating and Cooling System:** This section covers information relating to the availability of heating and cooling system and its types (if available). It also investigates its hours of operation, the month of switching off and on, the materials used for operation (petroleum products or electricity), then quantities used are identified in addition to its value in JDs as per purchase price for each household.
- **General Questions:** This is the last section and covers the available equipment used in the housing unit, quantity of equipment, operation hours in summer and winter, monthly and seasonal. It also contains questions on the nature of the rationalization procedures and whether used at the house or not. Then the expenditure on energy is calculated from the total income of the household. The last question of this section is related to the solar heater, whether is used or not and what are its aspects of use.

B. Instruction Manual

This manual contains the definitions and concepts in use, as well as the detailed instructions for the office and field staff at various supervisory and executive levels. It also contained detailed explanation of all the questions items in the questionnaire, and how to complete the data in a way that ensures high quality and accuracy. The booklet also includes the basic edit rules to be followed by enumerators and editors during questionnaires editing. In addition to the electronic edit rules for data processing.

C. Coding manuals

At the time of designing the survey questionnaire, it has been decided that all its questions bear pre-defined codes. The coding guides included the main coding guides on the used heating and cooling equipment.

2.2 Definitions and Classifications

Accommodation: It is an entire building (or part of it) that have walls and ceiling, was originally prepared for accommodating one households or more, even if it was vacant , closed or under construction at time of survey. The housing unit consists of one room or more with utilities, has a separate entrance and leads directly (or through a corridor or stairway) to a public road without passing through other housing units. The abandoned buildings (which are not suitable for the human beings accommodation) are not considered as households.

Type of Accommodation: It could be one of the following cases:

1. Villa: It is a building consisting of two floors at least or one floor consists of two suits. One of these floors or suits serves as drawing room and a living room, while the other serves as a sleeping place. It has a main entrance leading to the hall or lobby, has an inner stair case leading to the upper floor in the case of a two-storey building and has a garden or yard.

2. House: It is a building consisting of one floor or more may be a series of rooms in a single row, each of which has door leading to the courtyard or garden.

3. Apartment: It is a housing unit part of the building and has a separate door leading to this unit. The apartment shares some corridors and entrances with other flats. It is composed of one or more rooms (not less than 4 square meters) with utilities.

4. Hut: It is an independent Building and consists mostly of one room, usually some or all of the exterior walls of the hut are made of cheap and low quality construction materials such as zinc, asbestos, tin or cheap wood. It should be noted that if the dwelling is a room consisting of four walls (cement, bricks), then it is classified as a house, even if the roof is made of (zinc, asbestos, tin or wood), but if most of the walls are made of (zinc, asbestos, tin or wood), then it is classified as hut as well as the dwelling consist of more than one room.

5. Other: such as a tent, a cave, cottage, hut, caravan, etc.....

Area of the housing unit: It means the residence area in square meters, and includes the total of household residence area of all floors used by the household for their own purposes. The residence area includes utilities such as rooms, kitchen, bathroom and toilet, corridor and balcony, as well as garage, store room, water heating appliances and air conditioning rooms.

Virtual age of the house: It is the estimated or calculated period of time between the date of construction of the residence and the date of the interview expressed in full solar years (neglecting the months and days, whatever their numbers).

Construction material of the external walls: The number against the type of the external construction material is recorded in the answer space. The construction material could be one of the following cases:

- **Pure Stone:** The building should include at least three walls of pure stone or marble.
- **Stone and reinforced concrete:** The building should have two walls.
- **Reinforced concrete:** The majority of the walls are of reinforced concrete.
- **Cement Bricks:** The majority of the walls are of bricks.
- **Clay bricks and Stone:** The majority of the walls are of mud and stone.
- **Other:** any thing not mentioned above.

Type of the apartment:

1. **Ground:** The flat is on the road level.
2. **Middle:** All apartments located between the ground and last floor.
3. **Top:** the apartment located at the top of the building.

Thermalinsulation: To prevent the transmission of heat from one place to another in whole or in part, by utilizing the properties of some materials such as low thermal conductivity and increased heat capacity, leading to reduced energy consumption used for heating and cooling, by reducing the leakage of heat through walls and ceilings .

Gas cooker: Means a rectangular or square-shaped gas stove consisting of a number of burners only, and does not have a grill.

Disc heater: It is a metal disk that contains several insulated coils isolated from the outer metallic body. It is used for heating of foods.

Electric single element heater or more: It is an electric heating set contain an electrical resistance in the form of a coil made of tungsten. This coil is isolated from the outer body of the stove. The resistance temperature rises when the electric current passes through, then the air around the stove becomes hot through radiation and heat exchange. This type of stove can have one or more resistances (coils), but often no more than three.

Oil radiator: It is an electric heater that heats the oil in the stove and then heat moves to the air by the heat exchange process. The heater is made up of a number of elements for having maximum space for heat exchange (heating of the surrounding air the heat exchange process). It does not require re-fill with oil since it is being sealed to prevent evaporation of oil and to ensure its efficiency continuously.

Air condition: It is a device that runs by electricity to provide the room with suitable cool or hot air.

Regular fan: It is an electrical set a motor running on electricity. Three wide blades at least move to ventilate the room air.

Electrical conditioner (gas): The previous definition of air conditioner is the same definition for this set. The Freon gas is the subsistence used in air conditioner, which represents the most appropriate cooling material.

Air cooler: It is a conditioning set containing two chambers, one inside the other with straw- filled spaces between them with. Here, water is used to drench the straws, and then wet air is sucked from inside the room with assistance of electric fan.

Household: It means one or more individuals living in the same house, they may be relatives or not , but participate to arrangement of living affairs where they form a living unit who spend on the consumer requirements (goods and services) from the aggregate cash flow irrespective of the source of this revenue.

Average monthly income: It means all sources of income available to an individual, whether current income, income from operations of the assets owned by the household. The current income is divided into:

1. **Income from Employment:** It is the wage or salary received by the employee or worker (whether regular, temporary or trainee) in exchange for performing work to, this wage or salary can be in cash or in kind. It includes bonuses and overtime pay. However, if the person works for more than one party, then his total income from these parties is recorded. The in kind wage includes the value of clothing, food, transportation, housing ... etc. paid by the employer to the employee.
2. **Income of the self-employed workers:** It means the cash or in kind returns obtained by the person as a result of carrying out his own work whether he has employees or works alone, whether in the field of agriculture, industry, commerce, services or the like.
3. **Rents income:**
 - **Building rents:** These are amounts owed to the individual as a result of renting one or more building.
 - **Other rents:** They include the accruing cash amounts paid for any member of the household as a result of renting property other than buildings such as

machinery, equipment, cars, buses (leasing), leasing a farm, a shop with the equipment (e.g. , leasing a carpentry or black smith shop...) etc.

4. Ownership income: It is the income accruing to a financial or non-financial asset owner in exchange for provision of money or keeping the non-financial asset at the disposal of others. The ownership incomes include interest, dividends, shares and barren land rentals.

Land rent: It is the amount accruing to the land owner as a result relinquishing the right of its exploitation to others. It could be in cash or in kind according to an agreement between the owner and the lessee.

Interest: It is considered one of the forms of ownership incomes which financial assets owners deserve from certain types such as deposits bonds and loans.

Dividends and interest of shares: These two items can be named as shares, which represents the cash accruing to the individual during the survey period to the shareholders as a result of putting their money at the disposal of companies.

5. Transfer Income: It is the sum of cash for goods and services obtained by the household and often on a regular basis for financing household consumer spending from others without any obligation to work or present a financial asset or material to others (without charge). They are divided into:

- **Retirement income:** It means the income that individuals obtain for his past job.
- **Social Security Benefits:** It represents payments accruing during the survey period from the Social Security Corporation to the worker or employee after the end of his service or as a result of a work injury. Usually, it is paid as a lump sum.
- **Accruing Insurance Compensations:** They are the amounts owed to the individual from insurance companies as a compensation for a damage to his person or property and does not relate to his work.
- **Gifts:** The payment money or goods from non request or requirement.
- **Other Current Transfers:** It is the amount of cash received by any individual in the household not in the form of a gift or as a result of previous work or inflicted damage, but as a help, basically.

Heating used: The following are types of heating used at houses:

- 1. Central Heating Only:** These may be under- floor piping, radiators or central air conditioning.
- 2. Normal Only:** These include diesel, kerosene and gas heaters, wood, olive, coal or charcoal stoves.
- 3. Electric Only:** These include ordinary electrical heaters (one element or more), disc heater, oil radiator or electric air conditioner.

4. Mixed: This group includes two or more of the previous ones.

Air conditioning and refrigeration: The cooling methods used in the houses either ceiling fans, ordinary fans, air coolers or electrical air conditioner.

Energy rationalization: It means the optimal use of electrical energy resources, petroleum products available to the households for efficient operation of the equipment and sets in the proper manner and for a long period. That is done by reducing the loads on power stations and its network and also by reducing the consumption of oil products and renewable energy.

Solar heaters: (Also known as solar panels). It is a method to convert sunlight into heat and store it for later use. That is done through collecting of sunlight and converting it to thermal energy for heating homes, water, generating electricity by steam, drying of crops or for cooking.

2.3 Organizing the Survey Staff:

The staff consists of the Survey Management who is entrusted with all supervisory, administrative and technical tasks, as well as the Office Processing Staff consisting of the editors and the coders. Meanwhile, the Field Staff consists of controllers, editors and enumerators. This staff works under supervision of the field supervisor.

2.4 Selection and Training of Staff:

Team of this survey was selected according to criteria related to the nature of work. There was special focus on the quality of employees in terms of the educational level and area of specialization whenever possible. A training course for all employees was conducted. The course material included definition of the survey objectives, method of data collection and how to behave with the households and establishments. It also included a detailed explanation of all articles of the questionnaire. At the end of training, a written test was held to ascertain their levels of understanding of the concepts and instructions of the questionnaire.

3. Data Collection Stage

3.1 Organizing of Field Work

The enumerators perform the field work job. They are selected under supervision of controllers, where they are distributed into teams. Each team is made of two or three enumerators, an observers and an editor. The field work supervisor oversees the work progress.

3.2 Method of Data Collection

The process of data collection stage began in April 1, 2008 and lasted till the end of July 2009. Data on households was collected through the personal interview method. In some special cases, data was obtained by phone because it was not possible to obtain data from the field.

3.3 Editing of Fieldwork

The process of editing the field was entrusted to field editors. They have checked the completed questionnaires one by one. In the case of any error in the questionnaire, it is returned to the enumerator in order to visit the household for correcting the error.

4. Data Processing Stage

4.1 Office Processing

Upon delivery of the field - completed questionnaires to the Industry and Energy Section at the Department of Statistics, they were totally checked by the Office Processing employees in the above said Section. Errors were rectified (if any) either through direct contact with the concerned person in the household or being returned to the field supervisor to correct the error. Thereafter, the checked questionnaires were coded and forwarded to the Directorate of Information Technology for data entry.

4.2 Electronic Processing:

After completion of editing and coding of the questionnaires, they were sent to the Data Entry Section in the Directorate of Information Technology. The data was entered in accordance with the appropriate data entry software for this purpose. The data entered was reviewed, checked cleaned of errors one by one. Thereafter, the programmer extracted lists containing the preliminary results using the preset coefficients in order to check it and ascertain validity of the results.

4.3 Tabulation and Dissemination of Results

After checking the preliminary results and ensuring its validity in terms of form and data consistency within the same table and with other tables, the final tables were extracted contained in this report. It is worthy to mention here that these results were loaded on the web page of the Department of Statistics (DoS).