



**State of Palestine
Palestinian Central Bureau of Statistics**

**Household Energy Survey
(January 2015)**

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Introduction

Countries collect official statistics on energy use due to its vital role in the infrastructure, economy and living standards of any given country.

In Palestine, additional attention is warranted for energy statistics due to scarce natural resources, the high cost of energy and high population density. These factors demand comprehensive and high quality statistics.

Due to high residential consumption of energy, PCBS decided to conduct a special Household Energy Survey to provide high quality data about energy consumption by type of energy, the different energy consuming devices used by households, and energy consumption behavior. To this end, a questionnaire was attached as a module within the Area Statistics Survey.

PCBS conducted the Household Energy Survey to cover the month of January 2015 to ascertain energy consumption behavior.

The survey aimed to provide data on energy consumption by households and also on public energy consumption behavior and patterns by type of energy.

The survey covered data on energy indicators in households in Palestine, including statistical data on electricity and other types of fuel consumption in activities like cooking, baking, heating, lighting and water heating.

The report of the Household Energy Survey (January 2015) comprises three chapters: the first chapter briefly describes the main findings; the second chapter presents the methodology used in the survey, including the questionnaire design, sampling design, field work operations, data processing, data quality and technical notes; while the third chapter describes the concepts and definitions.

PCBS hopes that the results of this survey will provide the data required to develop the energy sector according to the needs of households as well as filling gaps in energy statistics and providing useful data for decision makers, researchers and other users.

Concepts and Definitions

This section presents the main concepts and definitions used to derive the main indicators of energy consumption from different sources. These concepts and definitions are based on international recommendations in the field of energy statistics, and they are the same in all subjects in Palestinian Central Bureau of Statistics. The main concepts and expressions mentioned in this report were as follows:

Household:

One person or a group of persons with or without a household relationship, who live in the same housing unit, share meals and make joint provision of food and other essentials of living.

Fuel:

It refers to any matter used for producing energy via thermal, chemical or nuclear interaction.

Gasoline:

Gasoline is a hydrocarbon fuel used mainly in internal- combustion engines. This fuel is obtained via filtration of crude oil. The quality of this type of fuel is measured by the octane number (from 0 to 100), which points to its resistance of early burning. This number is obtained by comparing the performance of its resistance of early burning with a mixture of C^7H^{16} and C^8H^{18} . For instance, the performance of “Gasoline 95” equals the performance of a mixture of 95% C^8H^{18} and 5% C^7H^{16} .

Diesel:

It is a liquid hydrocarbon fuel obtained by the distillation of crude petroleum. It is heavy oil distilled between 200°C and 380°C. Its point is always above 50°C, and its specific gravity is higher than 0.82.

Liquefied Petroleum Gas (LPG):

It is mainly used in heating as well as a fuel in some types of engines and as a raw material for chemical industries. Usually it is marketed in cylinder metallic packages. This gas is comprised of a mixture of gases, e.g. C^3H^8 and C^4H^{10} . It is obtained from natural gas or by fracture of crude petroleum.

Kerosene:

It is medium oil distilling between 150°C and 300°C. Its specific gravity is around 0.80 and the flash point above 38°C. It is used in sectors other than aircraft transport.

Charcoal:

It is a solid residue, consisting mainly of carbon, obtained by the destructive distillation of wood in the absence of air.

Olive Cake:

The olive cake (jeft) is the olive solid remainder after the olive pressing. It is considered as a byproduct.

Wood:

Refers to all wood used for fuel purposes.

Household Energy Consumption:

It refers to consumption by households in the different activities within households (Heating, Cooking, Lighting, Water Heating and other activities).

Electric Energy:

Work done to move an electric charge in a conductor. It is measured in kilowatt-hour.

Electric Energy = Power (KW) * Time (Hours).

Kilo Watt-Hour:

Energy unit, a 1 KWh = 1000 W * 3600 Second = $3.6 * 10^6$ Watt-second

Other prefixes are used for referring to this unit, e.g. Mega which equals 10^6 , and Giga, which equals 10^9 .

Questionnaire

This section presents a documentation of the methodology used in preparing this survey.

Questionnaire

The design of the questionnaire was based on the experiences of similar countries as well as on international standards and recommendations for the most important indicators, taking into account the special situation of Palestine.

Target Population:

It consists of all Palestinian households who are staying normally in Palestine during 2015.

2.1 Sample Frame

The sampling frame was based on master sample which was update in 2013-2014 for (Expenditure and Consumption Survey (PECS) and Multiple Indicator Cluster Survey (MICS)) surveys, and the frame consists from enumeration areas. These enumeration areas are used as primary sampling units (PSUs) in the first stage of the sampling selection.

Sample size:

The sample size is 7,690 households for Palestine level, 6,609 households responded.

Sampling Design:

The sample is two stage stratified cluster sample as following:

First stage: selection of a PPS random sample of 370 enumeration areas.

Second stage: A random area sample of 20 households from each enumeration area selected in the first stage.

Sample strata:

The population was divided by:

- 1- Governorate
- 2- locality type (Urban, rural, camps)

Weight calculation

The weight of statistical units (sampling units) in the sample is defined as the mathematical inverse of the selection probability where the sample of the survey is two-stage stratified cluster sample. Thus, in the first stage we calculate the weight of enumeration areas depending on the probability of each enumeration area. second stage we calculate the weight of households in each enumeration area. Initial household weights resulted from the product of the weight of the first stage and the weight of the second stage. Final household weights were obtained after adjustment of initial weights with the household estimates of the beginning of 2015 with regard to design strata (governorate, locality type).

Reference Period

This file shows the main finding of household energy survey, which executed on January 2015.

Data Collection

Field work activities started on 24/03/2015 and lasted until 31/05/2015. This survey covered the month of January 2015. Field workers were distributed to all governorates according to the sample size of each governorate. The field work team consisted of 55 members, including 10 supervisors, 7 editors and 38 fieldworkers.

Response Rate

7,690 households had been reached as a representative sample to Palestine, where the number of completed questionnaires amounted to 6,609 questionnaires of which 4,536 questionnaires were in the West Bank and 2,073 questionnaires in Gaza Strip. Weights were amended at the level of design strata to modify effects of refusals rates and lack of responses.

Data Quality

The concept of data quality covers many aspects, starting from the initial planning of the survey to the dissemination of the results and how well users understand and use the data. There are seven dimensions of statistical quality: relevance, accuracy, timeliness, accessibility, comparability, coherence and completeness.

Data Accuracy

1. Sampling Errors

The data of this survey is affected by mistakes of the survey as a result of the use of a sample, not a comprehensive survey of units of survey population, so it was certainly appearance of differences from the real values that we expected to get them through censuses. Expected differences and variation had been calculated of the most important indicators, this variation had been calculated of the most important indicators of the survey.

there was no problem in the dissemination of data on the level of the State of Palestine, and the region (the West Bank and Gaza Strip).

Summary on variation of calculations to the most prominent indicators of the survey

Variable	Estimated Ratio	Standard Errors	Confidence Interval %95		Coefficient of Variation	No of Observation
			Min	Max		
Percent of households had solar energy panels	56.5	0.9	54.8	58.2	1.6	3,679
Average Household Consumption of Electricity (KW.h)	306	3.53	299.07	312.97	1.2	6,518
Average Household Consumption of LPG (kg)	22.0	0.36	21.22	22.64	1.7	6,435

2. Non Sampling Errors

The non-sampling errors are possible to occur at all phases of implementing the project, through data collection and entry which could be summarized as non-response errors, and responding errors (respondents), and interview errors (fieldworkers) and data-entry errors. To avoid errors and reduce the impact, it had been made great efforts through extensive training of fieldworkers on how to conduct interviews, things that ought to be followed during an interview, things that should be avoided, making some practical and theoretical exercises during training session, in addition to providing them with a manual booklet for fieldworkers which contained a private key questions of questionnaire, mechanism to fill questionnaire and

methods of dealing with respondents to reduce refusal rates and providing correct and non-biased data.

As for office work, they had been trained for a special auditing of questionnaires and error detection, which greatly reduced rates of errors during field work. In order to reduce the percentage of errors during data entry, the program was designed to enter data so as not to allow any mistakes during the process and contained many of logical terms. This process led to disclosure of most of errors that had not been found in earlier phases of the work, where they were correcting all the errors that had been discovered.

After the completion of the aforesaid audits, data consistency was examined by computer using frequency and cross tables as turned out to be quite consistent, Errors impact was not detectable on data quality. This in turn gave a good impression of those in charge of the survey that we could rely on this data and extract reliable statistical and high significant indicators on the reality of corruption in Palestine.

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Items of interview results

Results of interviews	Number of cases
Completed	6,602
Partially completed	7
Household was abroad	94
No one at the house	383
Refused to cooperate	243
No available Information	20
The housing unit is uninhabited	211
Not existed housing unit	93
Others	37
Total	7,690

Equations of responsiveness and failures to response:

Percentage of increased inclusiveness errors = $\frac{\text{Total cases of increased inclusiveness}}{\text{Number of cases of the original sample}} \times 100\%$

And equals to = 4.0%

The percentage of non-response = $\frac{\text{Total cases of non-response}}{\text{Original sample net size}} \times 100\%$

And equals to = 10.5%

Net sample = original sample - (cases of increased inclusiveness) = 7,386

Response rate = 100% - the percentage of non-response.

And equal to = 89.5%

Comparability

The data of the survey are comparable geographically and over time by comparing data from different geographical areas to data of previous surveys and the 2007 census.

Data quality assurance procedures

Several procedures were undertaken to ensure appropriate quality control in the survey. Field workers were trained on the main skills prior to data collection, field visits were conducted to field workers to ensure the integrity of data collection, editing of questionnaires took place prior to data entry and a data entry application was used that prevents errors during the data entry process, then the data were reviewed. This was done to ensure that data were error free, while cleaning and inspection of anomalous values were carried out to ensure harmony between the different questions on the questionnaire.

Technical notes

The following are important technical notes on the indicators presented in the results of the survey:

- Some households were not present in their houses and could not be seen by interviewers.
- Some households were not accurate in answering the questions in the questionnaire.
- Some errors occurred due to the way the questions were asked by interviewers.
- Misunderstanding of the questions by the respondents.
- Answering questions related to consumption based on estimations.
- In all calculations related to gasoline, the average of all available types of gasoline was used.
- In this survey we asked about other special vehicles owned by households (informal sector) which led to the rise of households consumption rate of gasoline and diesel fuel compared to previous cycles.
- In this survey, data were collected about the consumption of olive cake and coal in households, but due to lack of relevant data and fairly high variance, the data were grouped with others in the statistical tables.
- The increase in consumption of electricity and the decrease in the consumption of the other types of fuel in the Gaza Strip reflected the Israeli siege imposed on the territory.

Computerize data

Data Processing:

The data processing stage consisted of the following operations:

1. Editing and coding prior to data entry: all questionnaires were edited and coded in the office using the same instructions adopted for editing in the field.

2. Data entry:

The household energy survey questionnaire was programmed and the data were entered into the computer in the offices in Nablus, Hebron, Ramallah and Gaza. At this stage, data were entered into the computer using a data entry template developed in Access. The data entry program was prepared to satisfy a number of requirements:

- To prevent the duplication of questionnaires during data entry.
- To apply checks on the integrity and consistency of entered data.
- To handle errors in a user friendly manner.
- The ability to transfer captured data to another format for data analysis using statistical analysis software such as SPSS.