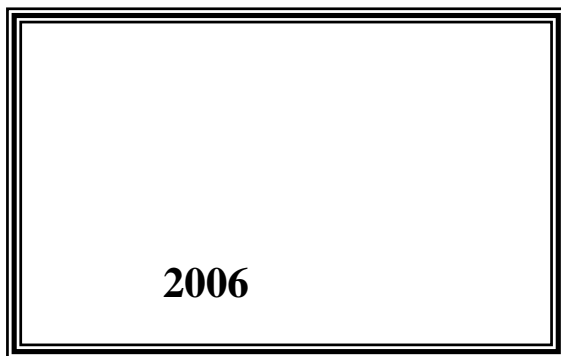


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<b>35</b>	:
35	1.4
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37	4.4
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<b>39</b>	:
39	1.5
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<b>43</b>	
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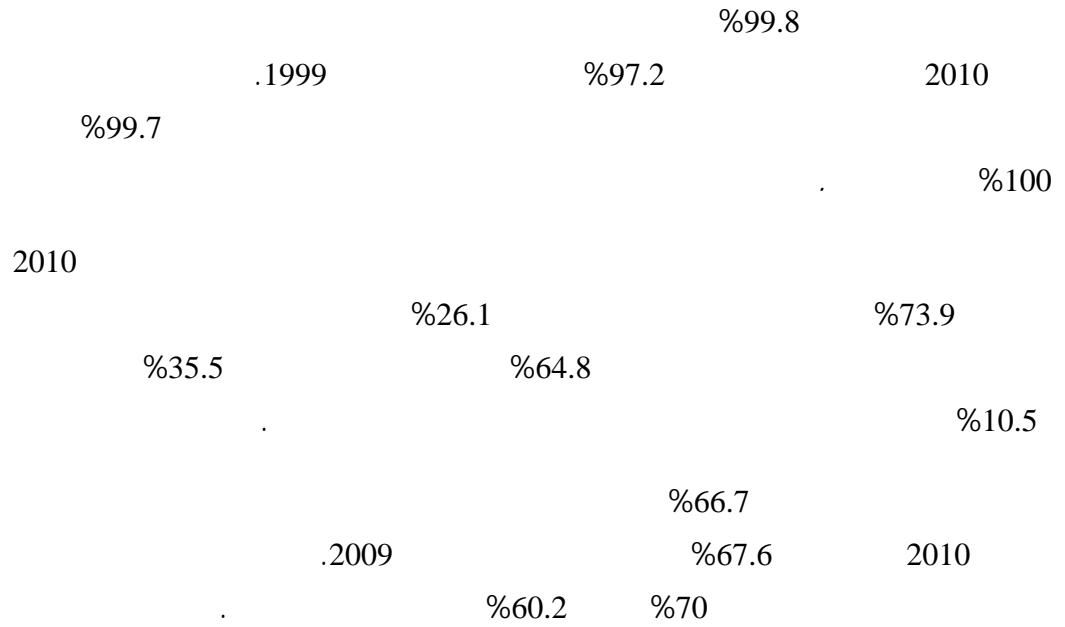
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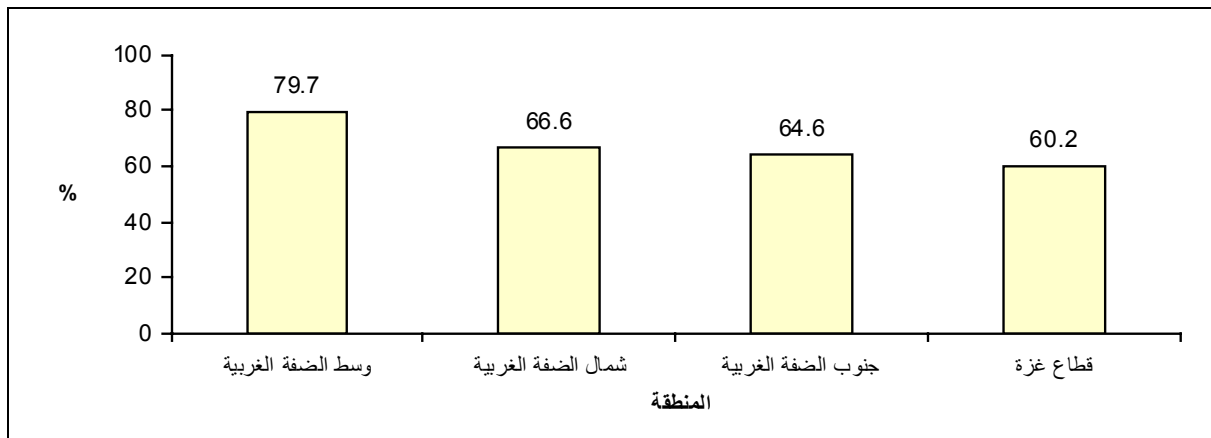
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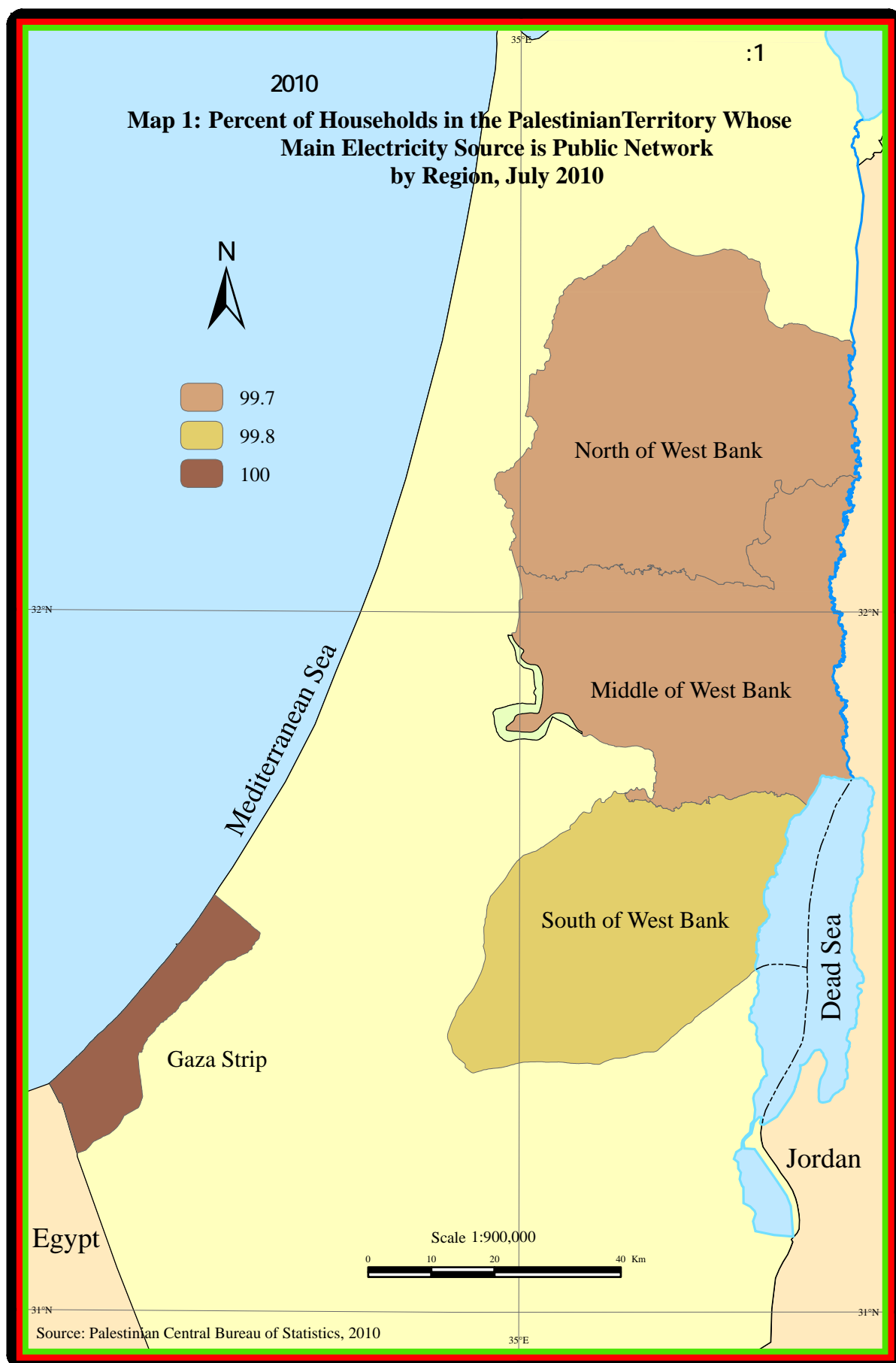


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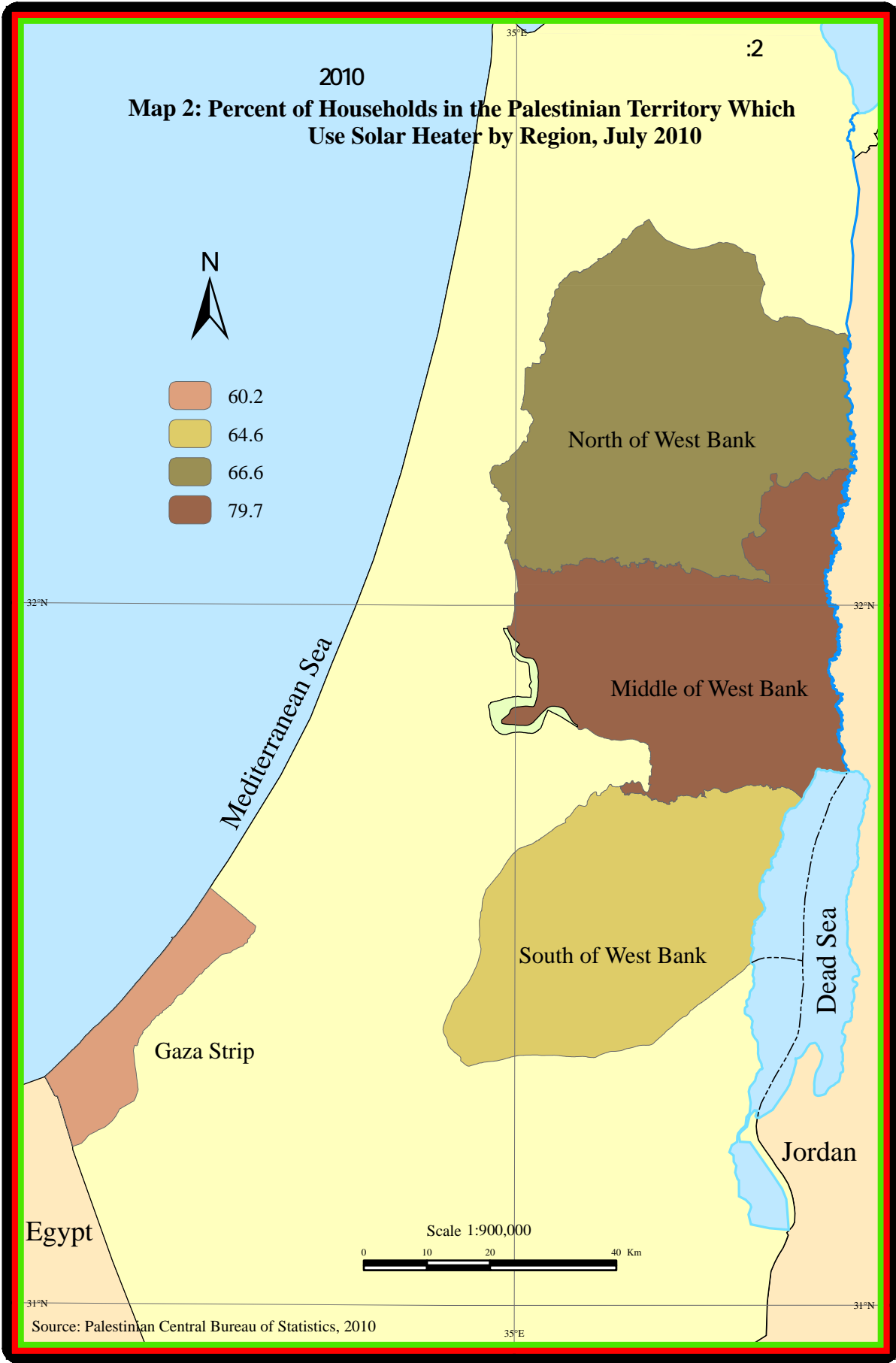
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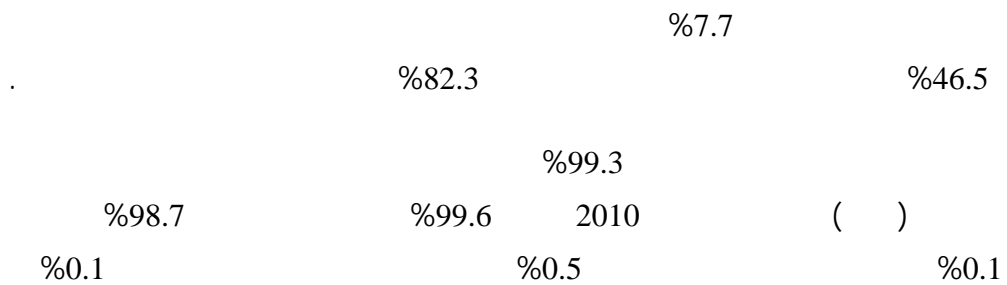






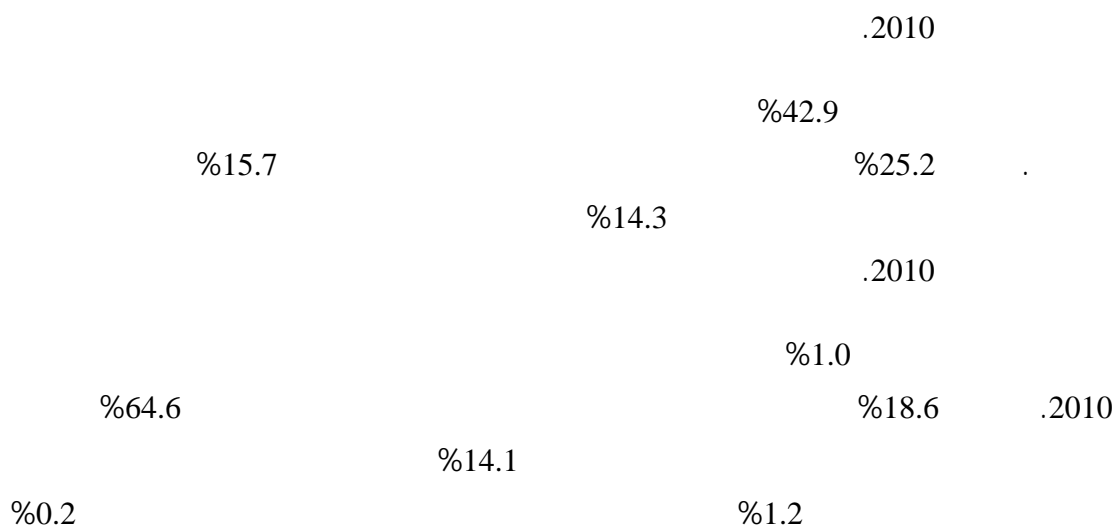
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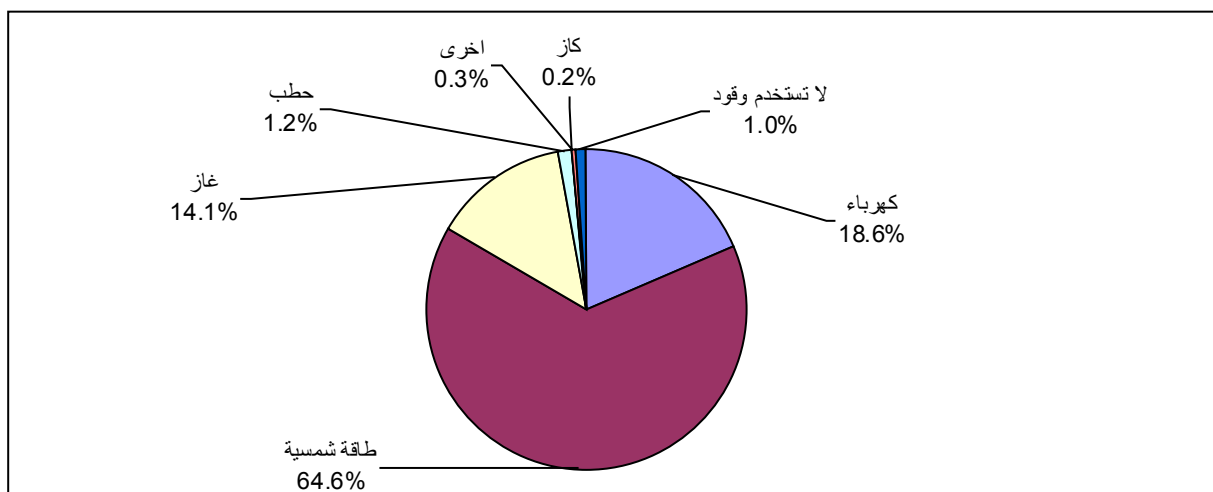
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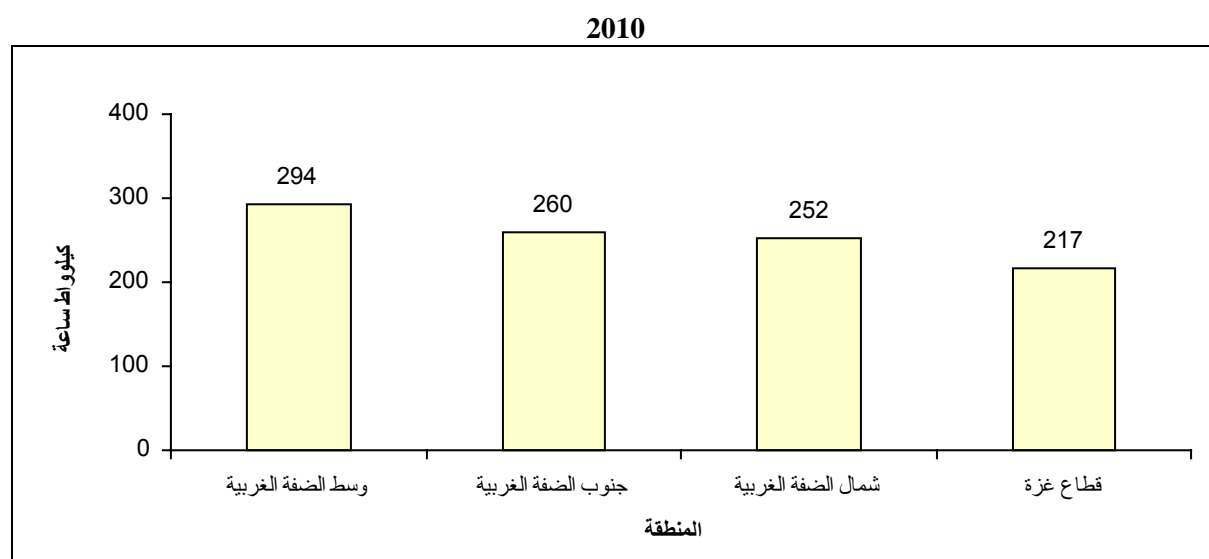
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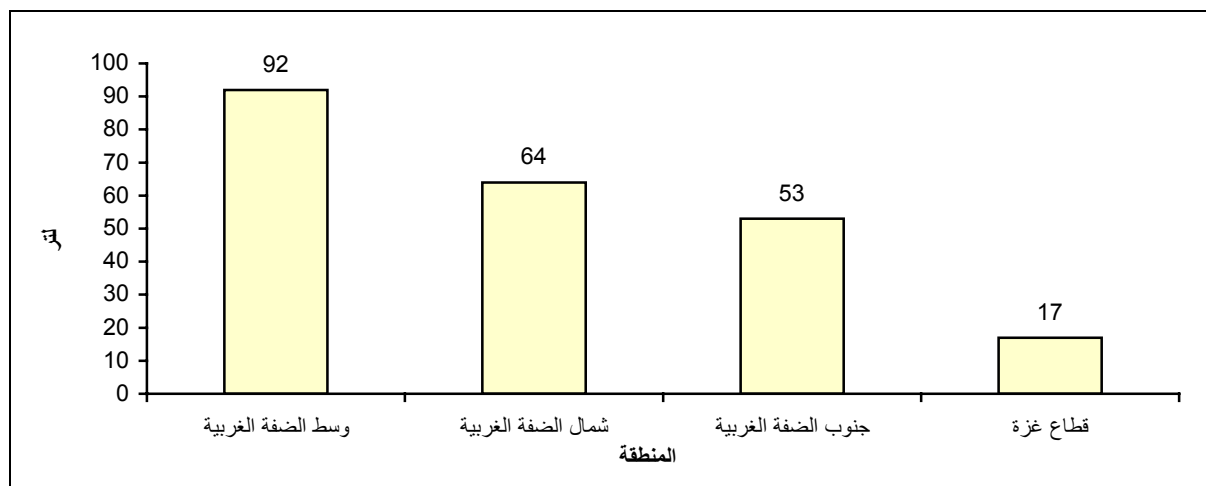


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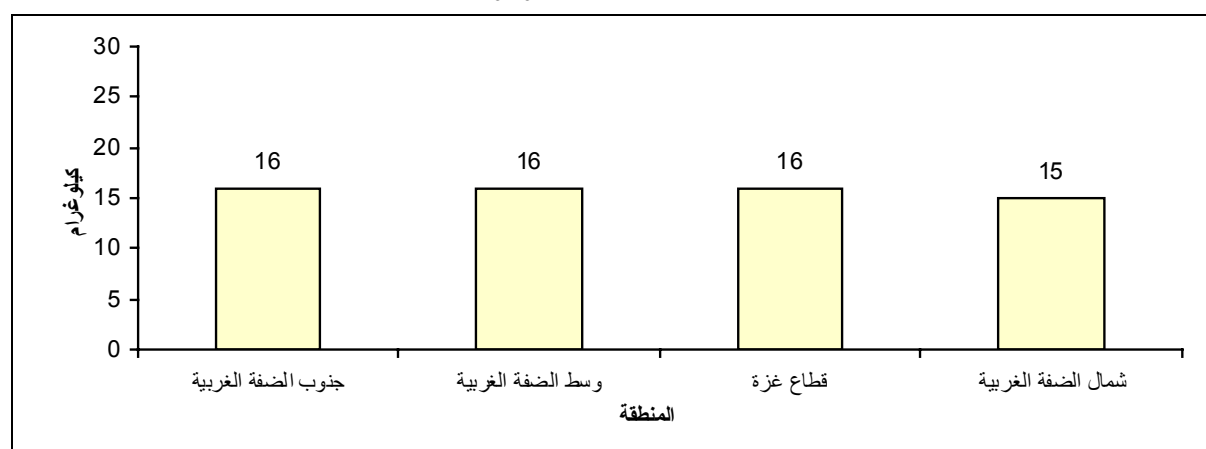
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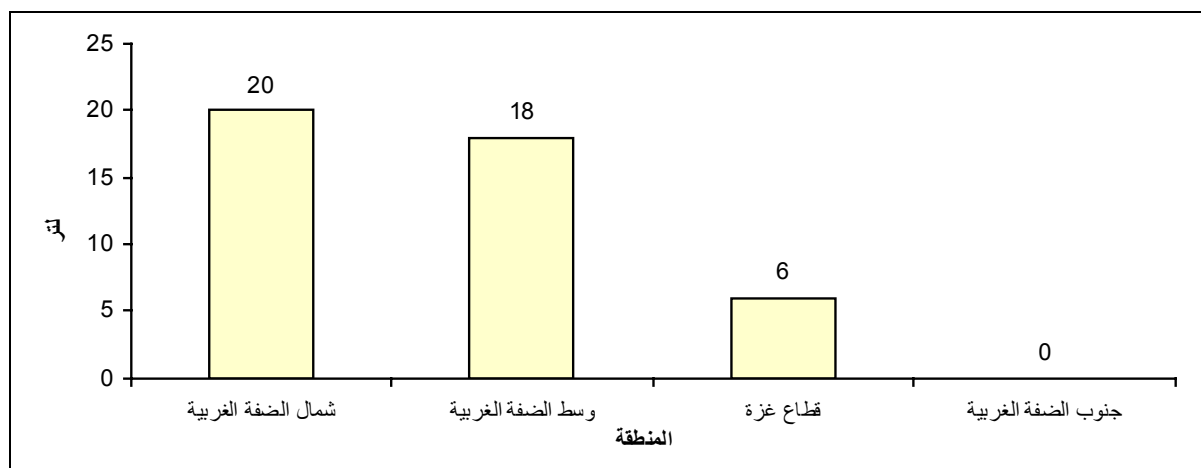
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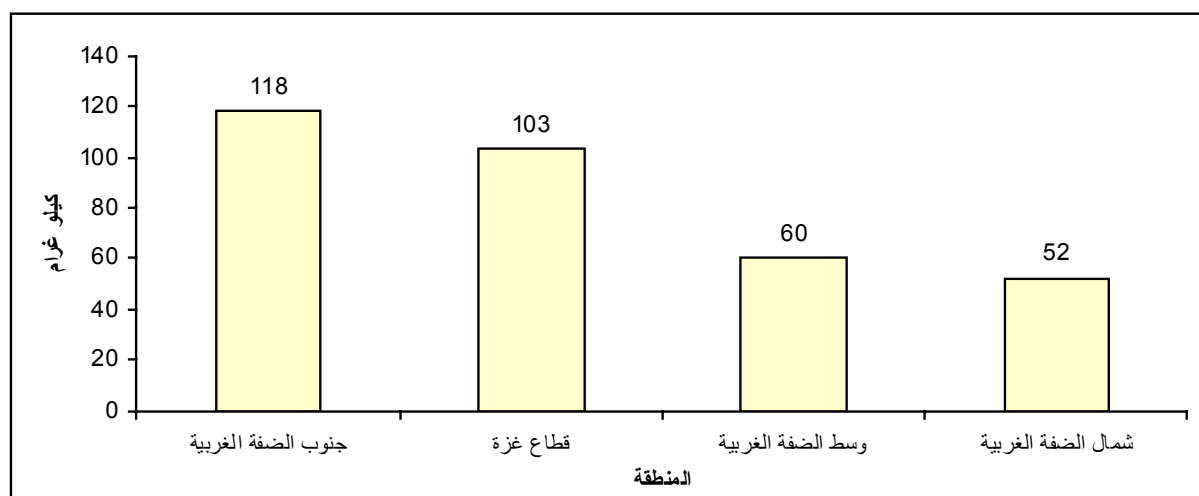
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# Tables



2010- 2008 ,2006 - 2003 ,2001 ,1999

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**Table 1: Household Energy Indicators in the Palestinian Territory, July 1999, 2001, 2003 - 2006, 2008- 2010**

Indicator	Year									
	2010	2009	2008	2006	2005	2004	2003	2001	1999	
Percent of Households Connected to the Electricity Public Network	99.8	99.9	99.8	99.5	99.6	99.5	99.4	99.1	97.2	
Percent of Households Using Solar Heater	66.7	67.6	68.2	69.2	69.2	71.2	71.2	72.5	68.0	
Percent of Households Using Space Conditioning Facilities	84.3	83.1	79.7	78.7	80.0	80.7	79.6	78.0	..	
Percent of Households Using Gas Burner for Cooking	99.3	99.3	..	98.8	99.1	99.7	99.6	99.4	99.1	
Average Consumption of Household from the Households that Used Electricity (KW.h)	250	247	271	227	264	264	274	272	380	( . )
Average Consumption of Household from the Households that Used LPG (Kg)	16	16	14	17	18	20	20	21	21	( )
Average Consumption of Household from the Households that Used Kerosene (Liter)	7	4	10	4	3	3	4	1	1	( ) ( )

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**Table 2: Percentage Distribution of Households in the Palestinian Territory by Region, Availability of Electricity Status and the Main Electricity Source in Housing Unit, July 2010**

Region	Availability of Electricity Status and Main Electricity Source in the Housing Unit				
	Total	No Electricity	Private Generator	Public Network	
<b>Palestinian Territory</b>	<b>100</b>	<b>0.1</b>	<b>0.1</b>	<b>99.8</b>	
<b>West Bank</b>	<b>100</b>	<b>0.2</b>	<b>0.1</b>	<b>99.7</b>	
North of West Bank	100	0.1	0.2	99.7	
Middle of West Bank	100	0.3	0.0	99.7	
South of West Bank	100	0.2	0.0	99.8	
<b>Gaza Strip</b>	<b>100</b>	<b>0.0</b>	<b>0.0</b>	<b>100.0</b>	

2010

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**Table 3: Percentage Distribution of Households in the Palestinian Territory by Region and Type of Electricity Meter Used, July 2010**

Region	Type of Electricity Meter Used			
	Total	Prepaid Meter	Normal Meter	
<b>Palestinian Territory</b>	<b>100</b>	<b>26.1</b>	<b>73.9</b>	
<b>West Bank</b>	<b>100</b>	<b>39.6</b>	<b>60.4</b>	
North of West Bank	100	64.8	35.2	
Middle of West Bank	100	10.5	89.5	
South of West Bank	100	35.5	64.5	
<b>Gaza Strip</b>	<b>100</b>	<b>0.0</b>	<b>100.0</b>	

2010

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**Table 4: Percentage Distribution of Households in the Palestinian Territory by Region and Number of Hours of Electricity Service, July 2010**

Region	Number of Hours of Electricity Service				
	Total	24 ساعة 24 Hours	17-23 ساعة 17-23 Hours	أقل من 16 ساعة Less Than 16 Hours	
<b>Palestinian Territory</b>	<b>100</b>	<b>65.4</b>	<b>0.1</b>	<b>34.5</b>	
<b>West Bank</b>	<b>100</b>	<b>99.5</b>	<b>0.1</b>	<b>0.4</b>	
North of West Bank	100	99.5	0.0	0.5	
Middle of West Bank	100	99.1	0.4	0.5	
South of West Bank	100	100.0	0.0	0.0	
<b>Gaza Strip</b>	<b>100</b>	<b>0.0</b>	<b>0.0</b>	<b>100.0</b>	



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**Table 5: Percentage Distribution of Households in the Palestinian Territory by Region and Solar Heater Usage Status, July 2010**

Region	Solar Heater Usage Status in the Housing Unit			
	Total	Not Using	Using	
<b>Palestinian Territory</b>	<b>100</b>	<b>33.3</b>	<b>66.7</b>	
<b>West Bank</b>	<b>100</b>	<b>30.0</b>	<b>70.0</b>	
North of West Bank	100	33.4	66.6	
Middle of West Bank	100	20.3	79.7	
South of West Bank	100	35.4	64.6	
<b>Gaza Strip</b>	<b>100</b>	<b>39.8</b>	<b>60.2</b>	

2010

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**Table 6: Percentage of Households in the Palestinian Territory by Region and Conditioning Facility Used, July 2010**

Region	Conditioning Facility			
	Mobile Fan	Fixed Fan	Electrical Conditioner	
<b>Palestinian Territory</b>	<b>82.3</b>	<b>46.5</b>	<b>7.7</b>	
<b>West Bank</b>	<b>89.0</b>	<b>30.0</b>	<b>9.7</b>	
North of West Bank	89.5	42.7	11.1	
Middle of West Bank	84.7	25.9	11.1	
South of West Bank	93.5	16.4	6.0	
<b>Gaza Strip</b>	<b>70.3</b>	<b>76.0</b>	<b>4.1</b>	

2010

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**Table 7: Percentage Distribution of Households in the Palestinian Territory by Region and the Main Cooking Facility Used, July 2010**

Region	Cooking Facility					
	Total	Kerosene Burner	Wood Burner	Gas Burner	Electrical Oven	
<b>Palestinian Territory</b>	<b>100</b>	<b>0.1</b>	<b>0.5</b>	<b>99.3</b>	<b>0.1</b>	
<b>West Bank</b>	<b>100</b>	<b>0.0</b>	<b>0.3</b>	<b>99.6</b>	<b>0.1</b>	
North of West Bank	100	0.0	0.1	99.9	0.0	
Middle of West Bank	100	0.0	0.1	99.8	0.1	
South of West Bank	100	0.0	0.7	99.1	0.2	
<b>Gaza Strip</b>	<b>100</b>	<b>0.3</b>	<b>0.9</b>	<b>98.7</b>	<b>0.1</b>	

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**Table 8: Percentage Distribution of Households in the Palestinian Territory by Region, Fuel Usage Status and the Main Fuel Used for Baking, July 2010**

Region	Total	Fuel Usage Status					
		Not Using Fuel	Used as Main Fuel for Baking				
			Others	Wood	LPG	Electricity	
Palestinian Territory	100	42.9	1.9	15.7	14.3	25.2	
West Bank	100	57.2	2.9	14.8	15.8	9.3	
North of West Bank	100	59.2	2.6	19.6	13.6	5.0	
Middle of West Bank	100	68.8	0.3	16.1	10.6	4.2	
South of West Bank	100	42.2	5.9	6.9	24.3	20.7	
Gaza Strip	100	15.3	0.1	17.3	11.4	55.9	

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2010

**Table 9: Percentage Distribution of Households in the Palestinian Territory by Region, Water Heating Status and the Main Fuel Used for Water Heating , July 2010**

Region	Total	Status Water Heating							
		Not Using Fuel	Used as Main Fuel for Water Heating						
			Others	Kerosene	Wood	LPG	Solar Energy	Electricity	
Palestinian Territory	100	1.0	0.3	0.2	1.2	14.1	64.6	18.6	
West Bank	100	1.6	0.3	0.1	0.8	15.3	68.8	13.1	
North of West Bank	100	0.3	0.0	0.2	1.3	18.7	64.4	15.1	
Middle of West Bank	100	3.9	0.1	0.0	0.8	5.9	79.2	10.1	
South of West Bank	100	0.9	1.0	0.0	0.2	20.6	63.7	13.6	
Gaza Strip	100	0.0	0.0	0.4	2.0	11.9	56.6	29.1	

2010

**Table 10: Percentage Distribution of Households in the Palestinian Territory by Region, Conditioning Usage Status and the Main Fuel Used for Conditioning, July 2010**

Region	Total	Conditioning Usage Status			
		Not Using Fuel	Used as Main Fuel for Conditioning		
			LPG	Electricity	
Palestinian Territory	100	15.7	0.1	84.2	
West Bank	100	17.5	0.1	82.4	
North of West Bank	100	18.6	0.0	81.4	
Middle of West Bank	100	9.7	0.0	90.3	
South of West Bank	100	24.4	0.3	75.3	
Gaza Strip	100	12.2	0.1	87.7	

2010

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**Table 11: Percentage of Households that Used Energy in the Palestinian Territory by Region, and Energy Type, July 2010**

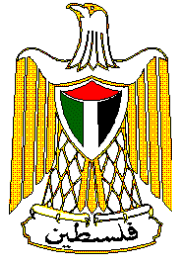
Region	Energy Type							
	Diesel	Gasoline	Kerosene	LPG	Solar Energy	Wood	Electricity	
<b>Palestinian Territory</b>	<b>6.4</b>	<b>24.1</b>	<b>8.1</b>	<b>99.5</b>	<b>66.7</b>	<b>17.9</b>	<b>99.8</b>	
<b>West Bank</b>	<b>6.0</b>	<b>19.0</b>	<b>0.9</b>	<b>99.6</b>	<b>70.0</b>	<b>16.8</b>	<b>99.7</b>	
North of West Bank	6.8	10.8	0.1	99.4	66.6	20.2	99.7	
Middle of West Bank	6.0	24.4	2.9	99.7	79.7	15.8	99.7	
South of West Bank	4.7	24.5	0.0	99.7	64.6	13.1	99.8	
<b>Gaza Strip</b>	<b>7.2</b>	<b>34.1</b>	<b>21.8</b>	<b>99.5</b>	<b>60.2</b>	<b>20.2</b>	<b>100.0</b>	

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**Table 12: Average Household Consumption of Energy from the Households that Used Energy in the Palestinian Territory by Region, July 2010**

Region	Average Household Consumption of Energy						
	( ) Diesel (Liter)	( ) Gasoline (Liter)	( ) Kerosene (Liter)	( ) LPG (Kg)	( ) Wood (kg)	( ) Electricity (KWh)	
<b>Palestinian Territory</b>	<b>52</b>	<b>45</b>	<b>7</b>	<b>16</b>	<b>82</b>	<b>250</b>	
<b>West Bank</b>	<b>70</b>	<b>71</b>	<b>18</b>	<b>16</b>	<b>69</b>	<b>267</b>	
North of West Bank	53	64	20	15	52	252	
Middle of West Bank	110	92	18	16	60	294	
South of West Bank	51	53	0	16	118	260	
<b>Gaza Strip</b>	<b>23</b>	<b>17</b>	<b>6</b>	<b>16</b>	<b>103</b>	<b>217</b>	



# **Palestinian National Authority Palestinian Central Bureau of Statistics**

## **Household Energy Survey: (July, 2010) Main Results**

**December, 2010**

PAGE NUMBERS OF ENGLISH TEXT ARE PRINTED IN SQUARE BRACKETS.  
TABLES ARE PRINTED IN THE ARABIC ORDER (FROM RIGHT TO LEFT)

**This document is prepared in accordance with the standard procedures stated in the Code of Practice for Palestine Official Statistics 2006**

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Mahmoud Jaradat
- **Overall Supervision**  
Ola Awad

Acting President





## **Preface**

Most countries provide official statistics on energy due to its importance to shed light on the infrastructure, economic situation and the standards of living in a given country.

In Palestine, additional special attention is given to energy statistics due to the shortage of natural resources, the high cost of energy and the high population density. All of these factors create a need for comprehensive and high quality statistics in this field of energy.

As households are considered the highest energy-consuming sector, PCBS decided to conduct a special Household Energy Survey to provide high quality data about energy consumption by type, different energy consuming facilities used at the household's level, and the behavior of this important sector in the consumption of energy.

PCBS conducts the Household Energy Survey twice a year. This survey was conducted to cover the month of July in order to know the energy consumption behavior in the summer season.

PCBS hopes that the results of this report will contribute towards providing the necessary data needed for developing the energy situation at the household's level. In addition, PCBS hopes that this report will contribute to bridging the gap in energy statistics and provide useful data for the decision makers and other users.

**December, 2010**

**Ola Awad  
Acting President**



## Table of Contents

Subject	Page
List of Tables	
List of Figures	
List of Maps	
Executive Summary	
Chapter One: <b>Introduction</b>	<b>[19]</b>
Chapter Two: <b>Concepts and Definitions</b>	<b>[21]</b>
Chapter Three: <b>Main Findings</b>	<b>[23]</b>
3.1 Energy Sources	[23]
3.2 Energy Consumption Facilities	[23]
3.3 Energy Uses	[24]
3.4 Household Energy Consumption	[24]
Chapter Four: <b>Methodology</b>	<b>[27]</b>
4.1 Questionnaire	[27]
4.2 Sample Frame	[27]
4.3 Fieldwork	[28]
4.4 Data Processing	[28]
4.5 Weight Calculation and the Estimation	[28]
Chapter Five: <b>Data Quality</b>	<b>[29]</b>
5.1 Accuracy	[29]
5.2 Comparability	[30]
5.3 Data Quality Assurance Procedures	[30]
5.4 Technical Notes	[31]
<b>References</b>	<b>[33]</b>
<b>Tables</b>	<b>45</b>



## List of Tables

Table	Page
<b>Table 1:</b> Household Energy Indicators in the Palestinian Territory, July 1999 2001, 2003 - 2006, 2008- 2010	<b>47</b>
<b>Table 2:</b> Percentage Distribution of Households in the Palestinian Territory by Region, Availability of Electricity Status and the Main Electricity Source in Housing Unit, July 2010	<b>48</b>
<b>Table 3:</b> Percentage Distribution of Households in the Palestinian Territory by Region and Type of Electricity Meter Used, July 2010	<b>48</b>
<b>Table 4:</b> Percentage Distribution of Households in the Palestinian Territory by Region and Number of Hours of Electricity Service, July 2010	<b>48</b>
<b>Table 5:</b> Percentage Distribution of Households in the Palestinian Territory by Region and Solar Heater Usage Status, July 2010	<b>49</b>
<b>Table 6:</b> Percentage of Households in the Palestinian Territory by Region and Conditioning Facilities Used, July 2010	<b>49</b>
<b>Table 7:</b> Percentage Distribution of Households in the Palestinian Territory by Region and the Main Cooking Facility Used, July 2010	<b>49</b>
<b>Table 8:</b> Percentage Distribution of Households in the Palestinian Territory by Region, Fuel Usage Status and the Main Fuel Used for Baking, July 2010	<b>50</b>
<b>Table 9:</b> Percentage Distribution of Households in the Palestinian Territory by Region, Water heating Status and the Main Fuel Used for Water heating, July 2010	<b>50</b>
<b>Table 10:</b> Percentage Distribution of Households in the Palestinian Territory by Region, Conditioning Usage Status and the Main Fuel Used for Conditioning, July 2010	<b>51</b>
<b>Table 11:</b> Percentage of Households that Used Energy in the Palestinian Territory by Region, and Energy Type, July 2010	<b>51</b>
<b>Table 12:</b> Average Household Consumption of Energy from the Households that Used Energy in the Palestinian Territory by Region, July 2010	<b>51</b>



## **List of Figures**

<b>Figures</b>	<b>Page</b>
<b>Figure 1:</b> Percentage of Households in the Palestinian Territory Using Solar Heater by Region, July 2010	<b>[23]</b>
<b>Figure 2:</b> Average Household Electricity Consumption in the Palestinian Territory from the households that used electricity by Region, July 2010	<b>[24]</b>





## **List of Maps**

<b>Maps</b>		<b>Page</b>
<b>Map 1:</b>	Percent of Households in the Palestinian Territory Whose Main Electricity Source is Public Network by Region, July 2010	<b>27</b>
<b>Map 2:</b>	Percent of Households in the Palestinian Territory Which Use Solar Heater by Region, July 2010	<b>29</b>



## **Executive Summary**

PCBS implemented the household energy survey (July 2010). This survey collected data on household energy indicators (electricity, petroleum fuel, and other types of energy) in the household activities (cooking, baking, water heating, lighting, and conditioning). Data collection took place during the period 22/08/2010 - 30/09/2010.

The results of the survey indicate that 99.8% of households in the Palestinian Territory were connected to the public electricity network in July 2010.

From the results, it is noted that 73.9% of households in the Palestinian Territory used a normal Electricity Meter; while 26.1% of households used a Prepaid Electricity Meter in July 2010.

The results of the survey indicate that 66.7% of households in the Palestinian Territory were utilizing solar energy heaters in July 2010; while this percentage was 67.6% in July 2009.

The findings of the survey indicate that the average electricity consumption of a household (from the households that used electricity) in the Palestinian Territory during July 2010 was 250 KWh, compared with 247 KWh in July 2009; while it reached 294 KWh in the Middle of the West Bank and did not exceed 217 KWh in Gaza Strip.

The findings of the survey indicated that the average gasoline consumption of a household (from the households that used gasoline) in the Palestinian Territory during July 2010 was 45 liters. It was 92 liters in the Middle of West Bank and did not exceed 17 liters in the Gaza Strip.

The findings indicate that the average liquefied petroleum gas consumption of household (from the households that used liquefied petroleum gas) in the Palestinian Territory during July 2010 was 16 kg which is the same percent in July 2009.

The findings indicate that 18.6% of households in the Palestinian Territory depend on electricity as a main source for Water Heating, 64.6% of households depend on solar heaters, and 14.1% of households depend on liquefied petroleum gas as a main fuel for Water Heating in July 2010.

The main results of the survey indicate that 7.7% of households in the Palestinian Territory used an electric conditioner for the purpose of air conditioning, 46.5% of the households used a fixed fan, and 82.3% of the households used a mobile fan in July 2010.



## Chapter One

### **Introduction**

In 1996, PCBS established an energy statistics program in order to develop a national plan for energy statistics and to provide data about energy in the Palestinian Territory. Taking into consideration the international and United Nations recommendations in the field of energy and the special situation of the Palestinian Territory, energy indicators were formulated through a user-producer dialogue workshop held in March 1998. The energy statistics program has implemented seventeen rounds of the Household Energy Survey during 1999-2010.

Because of the importance of the household sector and due to its large contribution to energy consumption in the Palestinian Territory, PCBS decided to conduct a special Household Energy Survey to cover energy indicators in the household sector. To achieve this, a questionnaire was attached to the Labor Force Survey.

This survey aimed to provide data on energy consumption in the household sector and to provide data on energy consumption behavior and patterns in the society by type of energy.

The survey presents data on energy indicators pertaining to households in the Palestinian Territory. This includes statistical data on electricity and other fuel consumption by households covering type of fuel for different activities (cooking, baking, conditioning, lighting, and Water Heating).

The Household Energy Survey (July 2010) report consists of five chapters: the first chapter presents the report objectives and structure; the second chapter describes the concepts and definitions; the third chapter briefly describes the main findings; the fourth chapter presents the methodology used in the survey, consisting of the questionnaire design, sampling design, fieldwork operations and data processing; and the last chapter includes an assessment of data quality and technical notes.



## Chapter Two

### 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 Conditioning 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 (Conditioning, 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 =  $1000 \text{ W} * 3600 \text{ Second} = 3.6 * 10^6 \text{ Watt-second}$

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

## Main Findings

This chapter presents the main findings of the Household Energy Survey. These results were divided into four sections: the first section introduces the results related to energy sources in the domestic sector during July 2010; the second introduces the results related to the facilities used in conditioning and cooking; the third section presents the usage purposes of energy types in the different activities of the households; and the fourth presents the household and per capita consumption of the different energy types.

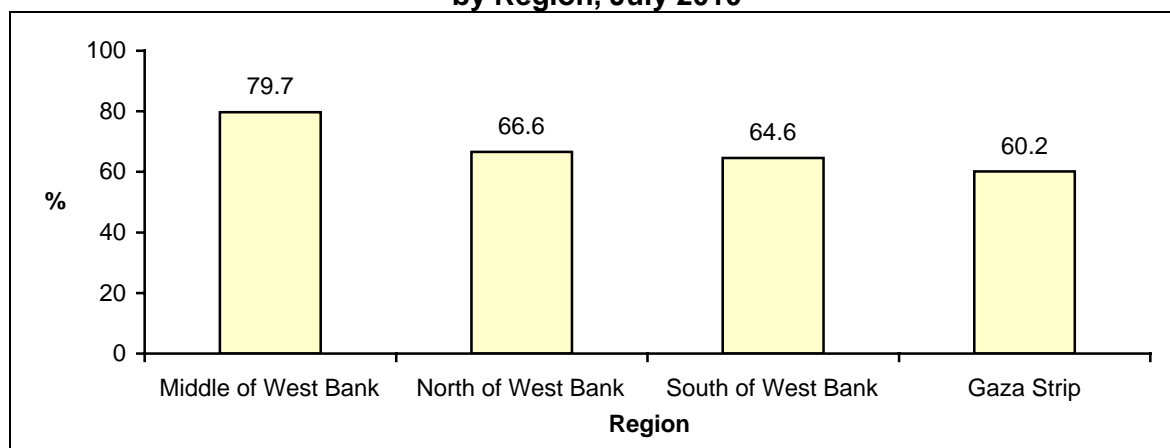
### 3.1 Energy Sources

The results of the survey indicated that 99.8% of households in the Palestinian Territory were connected to the public electricity network in July 2010.

From the results, it is noted that 73.9% of households in the Palestinian Territory used a normal Electricity Meter; while 26.1% of households used a Prepaid Electricity Meter in July 2010.

The results of the survey indicated that 66.7% of households in the Palestinian Territory were utilizing solar energy heaters in July 2010; while this percentage was 67.6% in July 2009.

**Figure 1: Percentage of Households in the Palestinian Territory Using Solar Heater by Region, July 2010**



### 3.2 Energy Consumption Facilities

This section introduces the results on the use of conditioning and cooking facilities by households during July 2010.

The main results of the survey indicated that 7.7% of households in the Palestinian Territory used an electric conditioner for the purpose of air conditioning, 46.5% of the households used a fixed fan, and 82.3% of the households used a mobile fan in July 2010.

The results of the survey also indicated that 99.3% of households in the Palestinian Territory used gas ovens for the purpose of preparing food (cooking) in July 2010, while 0.1% of the households used kerosene ovens, 0.5% of the households used wood burners and 0.1% of the households used electrical ovens.

### 3.3 Energy Uses

This section presents the use of energy types in different activities of households during July 2010.

The results of the Household Energy Survey indicated that 25.2% of households in the Palestinian Territory depend on electricity as a main fuel for baking, 15.7% of households depend on wood; while 14.3% of households depend on liquefied petroleum gas as a main fuel for baking.

The findings indicated that 18.6% of households in the Palestinian Territory depend on electricity as a main source for water heating, 64.6% of households depend on solar heaters, and 14.1% of households depend on liquefied petroleum gas as a main fuel for water heating in July 2010.

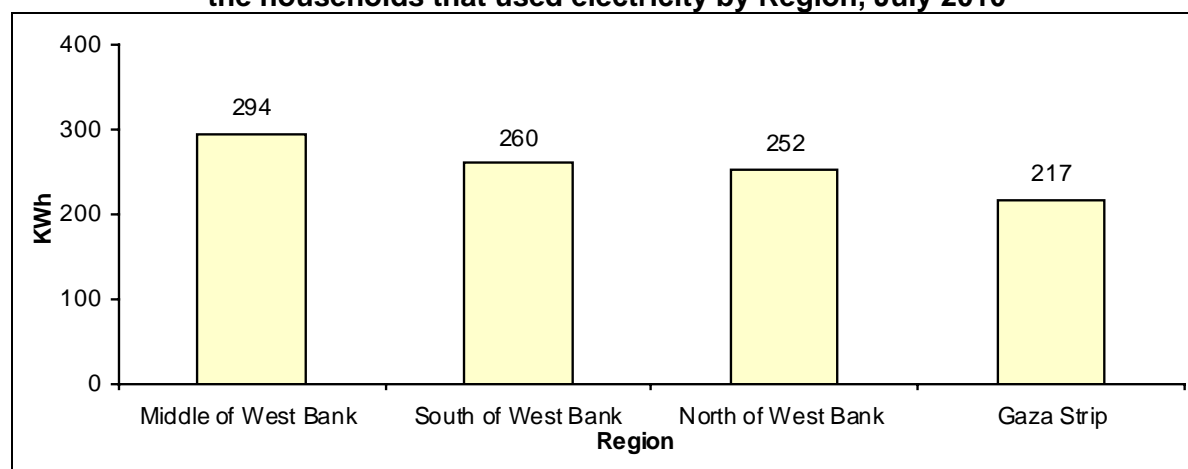
### 3.4 Household Energy Consumption

This section presents the main results related to household, per capita and total consumption of the different types of energy used in Palestinian Territory during July 2010.

#### Consumption of electricity:

The findings of the survey indicated that the average electricity consumption of a household (from the households that used electricity) in the Palestinian Territory during July 2010 was 250 KWh, compared with 247 KWh in July 2009; while it reached 294 KWh in the Middle of the West Bank and did not exceed 217 KWh in Gaza Strip.

**Figure 2: Average Household Electricity Consumption in the Palestinian Territory from the households that used electricity by Region, July 2010**



#### Gasoline Consumption:

The findings of the survey indicated that the average gasoline consumption of a household (from the households that used gasoline) in the Palestinian Territory during July 2010 was 45 liters. It was 92 liters in the Middle of West Bank and did not exceed 17 liters in Gaza Strip.

#### Liquefied Petroleum Gas Consumption:

The findings indicated that the average liquefied petroleum gas consumption of household (from the households that used liquefied petroleum gas) in the Palestinian Territory during July 2010 was 16 kg which is the same average as was in July 2009.

**Kerosene Consumption:**

The findings of the survey indicated that the average kerosene consumption of a household (from the households that used kerosene) in the Palestinian Territory during July 2010 was 7 liters. It reached 18 liters in the Middle of West Bank, 20 liters in the North of West Bank; while it was 6 liters in Gaza Strip.

**Wood Consumption**

The results indicated that the average wood consumption of a household (from the households that used wood) in the Palestinian Territory during July 2010 was 82 kg. It reached 69 kg in West Bank and 103 kg in Gaza Strip.



## Chapter Four

### Methodology

This section presents a documentation of the methodology used in conducting the Household Energy Survey including the design of the survey's instruments, data collection, data processing, and data tabulation.

#### 4.1 Questionnaire

The design of the questionnaire for the Household Energy Survey 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 the Palestinian Territory.

#### 4.2 Sample Frame

The sample is a two-stage stratified cluster random sample.

##### Target Population

The target population was all Palestinian households living in the Palestinian Territory.

##### Sampling Frame

The sampling frame is a master sample from the overall sample that was updated in 2003 for the households that were visited a third or fourth time in the Labor Force Survey, while the households to be visited for the first and second time were chosen from the Master Sampling frame of the Population, Housing and Establishment Census 2007. The sampling frame consists of a list of enumeration areas used as PSU's in the first stage of selection, and the households frame was used to choose households in the second level.

##### Sampling Design

The sample of this survey is a sub-sample of the Labor Force Survey (LFS) sample, which is conducted periodically since September 1995. The sample of LFS is distributed over 13 weeks. The sample of the Household Energy Survey occupies six weeks of the first quarter of 2010 of the LFS.

##### Stratification:

In designing the sample of the LFS, three levels of stratification were made:

1. Stratification by governorate.
2. Stratification by place of residence which comprises:  
(a) Urban      (b) Rural      (c) Refugee camps
3. Stratification by locality size.

##### Sample Unit:

In the first stage, the sampling units are the enumeration areas (clusters) from the master sample. In the second stage, the sampling units are households.

##### Analysis Unit:

The unit of analysis is the household.

**Sample Size:**

The sample size is comprised of (3,312) Palestinian households in the West Bank and Gaza Strip, where this sample was distributed according to locality type (urban, rural and refugee camps).

**4.3 Fieldwork****Training Fieldworkers**

Fieldworkers were trained on the main skills relevant to the survey before the start of data collection. Instructions for filling the questionnaire were made available for the interviewers. The training provided fieldworkers with aims and definitions of the different indicators of the survey.

**Data Collection**

Fieldwork activities started on 22/08/2010 and lasted until 30/09/2010. Fieldworkers were distributed to all governorates proportional to the sample size of each governorate. The fieldwork team consisted of 24 members, including one fieldwork coordinator, 4 supervisors, 4 editors and 15 interviewers.

During fieldwork 3,312 households were visited in the Palestinian Territory. 2,876 questionnaire were Completed in the Palestinian Territory.

**4.4 Data Processing**

The data processing stage consisted of the following operations:

1. Editing and coding before data entry: All questionnaires were edited and coded in the office using the same instructions adopted for editing in the field.
2. Data entry: At this stage, data was entered into the computer using a data entry template developed in Access. The data entry program was prepared to satisfy a number of requirements such as:
  - To prevent the duplication of the questionnaires during data entry.
  - To apply integrity and consistency checks of entered data.
  - To handle errors in user friendly manner.
  - The ability to transfer captured data to another format for data analysis using statistical analysis software such as SPSS.

**4.5 Weight Calculation and the Estimation**

Since the sampling weight is inversely proportional with the percentage of the sample from the frame, and as this ratio is different from the percentage sample for the population in the reference period, the weight was adjusted to show the total population at the start of 2010. The weights were also adjusted to make the distribution of persons in the sample by region, sex, and age structure to become identical to the distribution in the census 2007. Finally, weights were adjusted to compensate for incomplete cases that occur during data collection.

## Chapter Five

### Data Quality

The concept of data quality is constructed from many aspects starting from planning of the survey to disseminating the findings and understanding the results. The main principles of quality in statistics include Accuracy, Comparability, and Data Quality Assurance Procedures.

#### 5.1 Accuracy

It includes many aspects of the survey, mainly statistical errors due to the sample, and non statistical errors referring to the workers and tools of the survey. It includes also the response rates in the survey and their effect on the assumptions. This section includes:

##### 1. Sampling Errors

These types of errors evolved as a result of studying a part of the population and not all of it. Because this is a sampled survey, the data will be affected by sampling errors due to using a sample and not the whole frame of the population. Differences appear compared with the actual values that could be obtained through a census. For this survey, variance calculations were made for average household consumption and total consumption for the different types of energy in the Palestinian Territory.

The results of Gasoline, wood, charcoal and olive cake suffers from a high variance. This problem should be taken into consideration when dealing with the average household consumption of these types of fuel, keeping in mind that there are no problems in publishing the data for the geographical level (North of the West Bank, Middle of the West Bank, South of the West Bank and Gaza Strip). However, publishing data at the governorate level is not possible due to the high variance, especially for wood, charcoal and olive cake. The variances for the main indicators of this survey are as follows:

Variable	Estimate		Standard Error	C.V %	Confidence %95 Interval	
	Unit	Value			Lower	Upper
Main Electricity Source	%	99.8	0.1	0.001	99.4	99.9
Use of Solar Heaters	%	66.7	1.3	0.019	64.1	69.2
Use of LPG	%	99.5	0.2	0.002	99.0	99.8
Average Electricity Consumption	KWh	250	4.90	0.020	240	260
Average wood Consumption	Kg	82	5.96	0.072	70.7	94.3
Average Gasoline Consumption	Liter	11	0.84	0.078	9.2	12.5

##### 2. Non Sampling Errors

These errors are due to non-response cases as well as the implementation of surveys. In this survey, these errors emerged because of (a) the special situation of the questionnaire itself, which some parts depend partially on estimation, (b) diversity of sources (e.g., the interviewers, respondents, editors, coders, data entry operator, etc).



The sources of these errors can be summarized as:

1. Some of the households were not in their houses and the interviewers could not meet them.
2. Some of the households did not give attention to the questionnaire.
3. Some errors occurred due to the way the questions were asked by interviewers.
4. Misunderstanding of the questions by the respondents.
5. Answering the questions related to consumption by making estimations.

$$\begin{aligned}\text{None response rate} &= \frac{\text{Sum of none response cases}}{\text{Net sample}} \times 100\% \\ &= \frac{48}{3.312} \times 100\% = 1.45\%\end{aligned}$$

$$\begin{aligned}\text{Response rate} &= 100\% - \text{none response rate} \\ &= 100\% - 1.45\% = 98.55\%\end{aligned}$$

The none response cases were treated using adjustment groups (strata) using the following equation

$$fg = \frac{\sum_{ng} wi - \sum_{o.c} wi}{\sum_{rg} wi}$$

Where

$$\begin{aligned}\sum_{ng} wi &\text{ Total weights in g group} \\ \sum_{o.c} wi &\text{ Total weights over coverage} \\ \sum_{rg} wi &\text{ Total weights responding in the survey}\end{aligned}$$

$$w'gi = wi * fgi$$

## 5.2 Comparability

The data of the Household Energy Survey is comparable geographically and over time by comparing the data between different geographical areas with the data of previous surveys and census 2007.

## 5.3 Data Quality Assurance Procedures

Several measures had been taken to ensure the efficiency of quality controls in the survey, such as: the training of fieldworkers on the main skills before the start of data collection, conducting field visits to fieldworkers to ensure the integrity of data collection, editing of questionnaires before data entry, using data entry application that does not allow any mistakes during the process of data entry, and then examining the data. This was done to ensure data is error free ; while cleaning and inspection of the anomalous values have been made to ensure harmony between the different questions on the questionnaire.

## **5.4 Technical Notes**

This part presents the important technical notes on the indicators presented in the results of the survey:

- In all calculations related to gasoline, the average of all available types of gasoline was used.
- In this survey, data was collected about consumption of olive cake and coal in households, but due to lack of relevant data and fairly high variance , the data was 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 Gaza Strip reflected the Israeli siege imposed there.



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