# DIGITALES ARCHIV

Jawad, Yousef Abdel; Ayyash, Issam

**Article**

# Analysis of household expenditure on electricity in Palestine

**Provided in Cooperation with:**
International Journal of Energy Economics and Policy (IJEEP)

This Version is available at:
http://hdl.handle.net/11159/5100

# Analysis of Household Expenditure on Electricity in Palestine

## Yousef Abdel Jawad[1]*, Issam Ayyash[2]

[1]Al-Quds Open University, Palestine, [2]Palestine Technical University, Palestine. *Email: Yousef.abed.1989@hotmail.com/E.ayash@ptuk.edu.ps

**ABSTRACT**

The aim of the study is to explore and determine the factors influencing household expenditure on electricity in Palestine for 2011, using the ordinary least squares method in data analysis, and using the logarithmic model. The effect of the number of dwelling rooms, number of bedrooms, income, number of family members, and goods and services on household electricity expenditure. The study found that the number of rooms in the dwelling, number of bedrooms, income, number of family members, total expenditure on goods and services were all statistically significant and positively associated with spending on electricity. The study showed that the urban areas are the most spending on electricity, and according to the region, the study showed that the central areas of the West Bank is the most spending on electricity, while it was found that the housing used in the construction of external walls concrete, the least expenditure on electricity.

**Keywords:** Household Electricity, Expenditure on Electricity, Electricity in Palestine
**JEL Classifications:** B22, C21, C51, Q43, P21

## 1. INTRODUCTION

Electricity is the main driver of this life at the moment. All the details of our daily lives are dependent on this important energy, and very much for its operation, hence the importance of this energy.

The importance of rationalizing electricity consumption is becoming more and more important. One of the most important benefits of rationalizing electricity consumption is reducing the electricity bill of the subscriber, avoiding the separation of peak load times, reducing environmental emissions due to fuel savings in power stations, in addition to optimization of fossil energy sources such as petroleum and its derivatives used in power plants.

Perhaps the most important thing that helps us to rationalize the consumption of electricity in the household sector is to determine the factors that affect our consumption of electricity, and their correlation either positive or negative and the impact on the electricity bill, as the domestic sector in Palestine accounts for

the largest proportion of electricity consumption, Participation in public electricity networks in Palestine to 99% of residential units (PCBS, 2013).

With the increasing problem of electricity indebtedness in the Palestinian Authority territories and increasing loads on the public network, it was important to clarify the factors influencing the increase in electricity spending and to identify the areas with the highest expenditure on electricity to find appropriate policies to reduce pressure on public electricity networks. The questions we will answer in this paper include:
1. Is there a relationship between expenditure on electricity and household income, number of rooms in the dwelling, number of bedrooms, number of family members, total expenditure on goods and services for families?
2. How much does the household income, number of rooms per dwelling, number of bedrooms, number of household members, total expenditure on household goods and services affect the expenditure on electricity?

3.  Are there differences of statistical significance for electricity expenditure by population group?
4.  Are there statistical differences in electricity expenditure by region (Gaza Strip and West Bank areas)?
5.  Are there differences of statistical significance for the expenditure on electricity according to the predominant material in building the outer walls of the house?

This study aims to shed light on the reality of the consumption of electricity for the domestic sector in Palestine, indicating the relationship between: Monthly income, number of family members, number of rooms, number of bedrooms, total expenditure of households and expenditure on household electricity. To contribute to the rationalization of electricity consumption in the domestic sector, and contribute to the development of plans and programs to rationalize electricity consumption and reduce the pressure of loads on the electricity network in Palestine.

The importance of the study stems from the direct impact of electricity consumption on the electricity bill for the Palestinian citizen, as this has a direct impact on the welfare of the citizen, knowing that the poverty rate in Palestine in 2011 reached about 25.8% according to the Palestinian Central bureau of Statistics (PCBS).

## 2. LITERATURE REVIEW

In this section we review some of the local, Arab and foreign studies that deal with the problem of our research in its various aspects, while giving each study the specificity of place and time and the purpose thereof.

In Taweel (2013) study of the reality of electricity in the Gaza Strip to determine the determinants of demand for electricity, the following parameters were taken: The number of subscribers, the number of residents in the city and towns supplied by the company, the number of workers, the quantity consumed for previous periods, Average per capita income, number of employees, and regression analysis using the ordinary least squares (OLS) method. Using the linear relationship, it was found that the number of participants is the most influential factor in the demand for electricity, while in another study in Riyadh (Musa and Zaanan, 2012) used other determinants: Population, per capita income of gross domestic product, and in another study in Lebanon (Sidra, et al., 2009), real import factors were used to denote economic activity, temperature and relative humidity to estimate electricity demand. But Al-Qunaibet (1989) in Kuwait pointed out that the real price of electricity, average real per capita income, average temperature and average relative humidity are among the most important determinants of electricity demand.

In another study in Spain (Blázquez, et al., 2012) variables were taken from income, weather and electricity prices, using cross-sectional data covering 47 governorates in the period 2000-2008. Using the least squares method, Income has a positive and significant impact on electricity consumption while prices have an effect in both short and long time and its negative elasticity.

We note that each of the previous studies agree with our study of taking monthly income one of the determinants of spending

on electricity, while a study in Pakistan (Khattak, et al., 2010) agrees with our study of income and number of rooms as specific factors for domestic electricity demand, where a questionnaire was distributed to 200 families from the city of Roral, using a multimodal logistic model to derive estimates. whereas a study in Seoul (Seung, et al., 2007) found that the size of the household, the size of the house, the use of electrical appliances and household income have a positive relationship to the demand for electricity.

But in another study in India (Filippini and Pachauri, 2004) included factors that were neglected in this study, namely the four seasons and the status of homes and demographic and geographic places that have an impact on the demand for electricity as well as electricity prices, the logarithmic model was used to find the relationship between demand on the electricity and the price and income in the residential sector, where data was taken cross-section of more than 30 thousand families, and estimated monthly data for each of the summer and autumn and winter, and found that the most influential is income, and the price is not flexible in all seasons.

While the Keith and Rylatt (2007) study in Britain was designed to predict energy consumption with different housing patterns. The questionnaire was used, supported by annual data on floor space estimates and electricity and gas consumption from GIS. The simple and multiple linear regression Spearman's correlation to the strength of the relationship between the consumption of electricity and the determinants in the study of the number of rooms and the number of bedrooms and work rooms in addition to the area of the apartment and the age of the building and provide some of the devices of television, computer, satellite and electric heaters. Where the study found that there is no effect of the structure of the building on the expenditure on energy, while there is a positive relationship between the area of apartments and the number of rooms and bedrooms, work rooms and some electrical appliances.

From the above, the monthly income, the number of household members and the number of rooms in the house should be included as factors affecting the expenditure on electricity, with the possibility of using the OLS method in the analysis and using the logarithmic model to unite the different units between the variables.

## 3. METHODOLOGY AND DATA

### 3.1. Methodology
The descriptive and quantitative analytical method was used in this study. The logarithmic model was used to expresses the relationship between the dependent variable and the independent variables. The least squares method (OLS) was used in the analysis of the data. The model used in the study is:

$$LN\ (EXPEN\_ELECTRICITY) = \beta_0 + \beta_1\ LN\ (num\_room) + \beta_2\ LN\ (num\_bedroom) + \beta_3\ LN\ (MONTH\_INCOME) + B_4\ LN\ (Tot\_Exp) + \beta_5\ LN\ (num\_family) \quad (1)$$

Variables represent:
EXPEN_ELECTRICITY: The amount of electricity expenditure in Israeli shekels.
num_room: Number of rooms in the dwelling.

num_bedroom: Number of bedrooms in the dwelling.
MONTH_INCOME: Monthly income.
Tot_Exp: Total expenditure on goods and services.
num_family: Number of family members.

## 3.2. Data

The sample size was 4317 households (January 15, 2011-January 14, 2012). The sample was random and systematic, while 47 households were deleted in this study because they did not answer the amount of electricity expenditure. Where the number of households become in this study 4270, including 2871 in the West Bank and 1399 in the Gaza Strip.

Where the source of the data is the PCBS, which conducted a household expenditure and consumption survey for 2011, and the survey includes demographic, social and economic data of selected household members, household characteristics, household expenditure data on food and non-food items over a month, and durable goods, subsidies, poverty, and annual and monthly income.

Table 1 summarizes the measures of central tendency and dispersion of study variables.

The Table 1 shows that the average number of rooms per dwelling in Palestine was 3.68 rooms, and the number of rooms in the housing ranges from one room to 16 rooms, and the average number of rooms in the house in Palestine was 2.34 rooms, and the number of bedrooms in the housing between a room to 8 rooms.

The average monthly income of the family in Palestine was 3,894 Israeli shekels, and the family income ranges from 25 to 45645 shekels. Where as the average income of the West Bank was the highest and averaged 4683 NIS, while the average income for the North and South of the West Bank and the Gaza Strip was 4604, 4051, 266 NIS, respectively. And the average income per urban was the highest with an average of 4062 NIS, while the average income for both the rural and the camp was 3976, 3373 NIS, respectively.

Also, Table 1 shows that the average number of family members in Palestine was 6, and the number of members of Palestinian families ranged from 1 to 28 persons in the family. Through a side analysis, 72.4% of the households in Palestine had 5 members or less, While households with 5-7 individuals account for 27.6% of households.

And the data showed that the average monthly expenditure of the family in Palestine amounted to 4724 shekels, and the monthly expenditure of the family between 298 and 73219 Israeli shekels.

According to the analysis, the average monthly expenditure of Palestinian households is higher than the average monthly income by 830 NIS, while households spend <1,500 NIS per month, 8.2%. The proportion of households that spend 1500-5000 shekels per month to 59.6%.

According to the Table 1, the average monthly expenditure of households in Palestine on electricity amounted to 172 Israeli shekels, and the monthly expenditure of households on electricity ranges from 10 to 940 shekels.

And through a side analysis of data, 77.9% of households spend less than NIS 200 per month on electricity. 4.5% of the households have extreme expenditure on electricity. Their monthly expenditure on electricity is more than 357 NIS.

# 4. ANALYSIS

In this section, household electricity expenditure will be analyzed at the regional level (West Bank and Gaza Strip), by type of population (urban, rural, camps) and by the predominant material in the construction of the outer walls of dwellings.

## 4.1. Electricity Expenditure by Region (West Bank and Gaza Strip)

The average monthly electricity expenditure in the northern West Bank was NIS 171, whereas the average monthly electricity expenditure in the central and southern West Bank was NIS 222 and NIS 174 respectively, while for the Gaza Strip monthly electricity expenditure was NIS 137. And Table 2 illustrates some of the measures of central tendency and dispersion of electricity expenditure by region.

To test whether there are significant differences in electricity expenditure by region:

$$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 \qquad H_A: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$$

From Table 3 we find that $P = 0.000 < \alpha$ between groups. Thus, we reject null hypothesis, which shows that there are statistically significant differences in expenditure on electricity by region. The Table 3 shows that the middle of the West Bank spends more on electricity than other regions, where it increases Electricity expenditure in the central West Bank is about NIS 50, the southern West Bank is about NIS 48, and the Gaza Strip is NIS 84. While there were no statistically significant differences in electricity expenditure between the north and south of the West Bank.

**Table 1: Statistical description of study variables**

| Variable | Mean | Median | Mode | Standard deviation | Min. | Max. |
|---|---|---|---|---|---|---|
| EXPEN_ELECTRICITY | 172 | 150 | 100 | 96.71 | 10 | 940 |
| Num_room | 3.68 | 4 | 4 | 1.325 | 1 | 16 |
| Num_bedroom | 2.34 | 2 | 2 | 0.905 | 1 | 8 |
| Monthly income | 3894 | 3041 | 2000 | 3470.644 | 25 | 45645 |
| Num_family | 6 | 6 | 6 | 2.732 | 1 | 28 |
| Tot_Exp | 4724 | 3735 | 2299 | 4147 | 298 | 73219 |

The table was calculated by the researcher based on the data of the household expenditure and consumption survey 2011

**Table 2: Statistical description of expenditure on electricity by region**

| Region | % in the sample | Min. | Max. | Mean | Variance |
|---|---|---|---|---|---|
| North West Bank | 27 | 20 | 940 | 171 | 9936 |
| Middle West bank | 23 | 20 | 875 | 222 | 13965 |
| South West bank | 17 | 13 | 450 | 174 | 6728 |
| Gaza strip | 32 | 10 | 650 | 137 | 4057 |

The table was calculated by the researcher based on the data of the household expenditure and consumption survey 2011

**Table 3: Multiple comparisons**

| Region (I) | Region (J) | Mean difference (I-J) | Sig. |
|---|---|---|---|
| North West bank | Middle west bank | −50.17 | 0.000 |
| | South west bank | −2.28 | 0.599 |
| | Middle west bank | 33.99 | 0.000 |
| Middle West bank | North west bank | 50.17 | 0.000 |
| | South west bank | 47.89 | 0.000 |
| | Gaza strip | 84.16 | 0.000 |
| South West bank | North west bank | 2.28 | 0.599 |
| | Middle west bank | −47.89 | 0.000 |
| | Gaza strip | 36.27 | 0.000 |
| Gaza strip | North west bank | −33.99 | 0.000 |
| | Middle west bank | −84.16 | 0.000 |
| | South west bank | −36.27 | 0.000 |
| F- statistic between groups | 162.786 | - | - |
| Prob (F.stat) between groups | 0.000 | - | - |

Dependent variable: LN (EXPEN_ELECTRICITY). The table was calculated by the researcher based on the data of the household expenditure and consumption survey 2011

To further illustrate the expenditure on electricity by region, electricity expenditure was divided into groups, starting from NIS 50 per month and ending with NIS 400 per month, an increase of NIS 50 per group. Figure 1 illustrates this:

Figure 1 shows that those who spend <200 NIS per month in the northern West Bank are 77.6%. In the West Bank, 60% and 76.3% were in the southern West Bank, while 91.7% were in the Gaza Strip. The proportion of those who spend more than 300 shekels per month on electricity is 6.5%, 14.9%, 6.2%, 1.6% for the northern West Bank, Central West Bank, Southern West Bank and Gaza respectively.
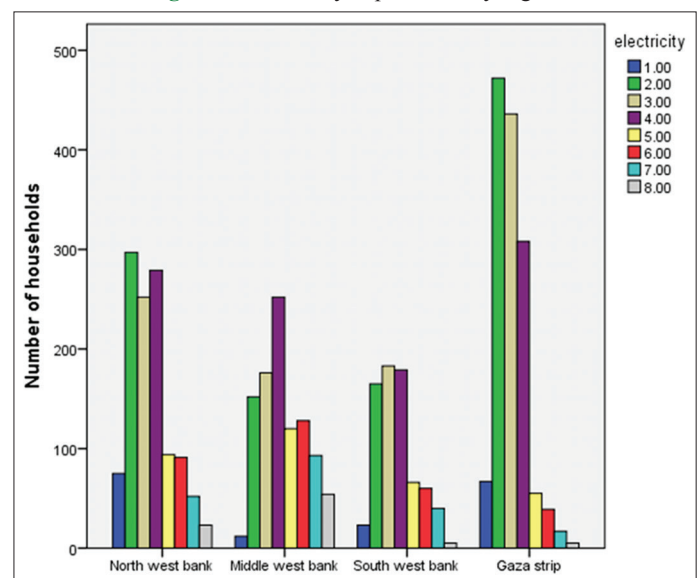
## 4.2. Electricity Expenditure by Type of Population

The average monthly expenditure on electricity in urban areas was 176 NIS. In rural areas, the average monthly expenditure on electricity was 165 NIS, while the average monthly expenditure on electricity in the camps was 172 NIS. The Table 4 shows some measures of central tendency and dispersion of electricity expenditure by type of population.

To test whether there are significant statistical differences in the expenditure on electricity by type of population:

$$H_0: \mu_1 = \mu_2 = \mu_3 \quad H_A: \mu_1 \neq \mu_2 \neq \mu_3$$

From Table 5 we find that P = 0.000 < α between groups. Thus, we reject null hypothesis, which shows that there are statistically significant differences in expenditure on electricity by type of population. It is noted that the average expenditure on electricity in urban areas is the largest, exceeding the average expenditure on electricity in rural areas by about 11 NIS per month, while the differences between the average expenditure on electricity in urban areas and camp areas is not statistically significant.

**Figure 1:** Electricity expenditure by region



To further illustrate the expenditure on electricity by type of population, electricity expenditure was divided into groups, starting from NIS 50 per month and ending with NIS 400 per month, an increase of NIS 50 per group. Figure 2 illustrates this.

## 4.3. Expenditure on Electricity According to the Predominant Material in the Construction of the Outer Walls of the Dwelling

The average expenditure on electricity for each of the houses with a majority of its outer walls of clean stone was NIS 209, while the average expenditure on electricity for dwellings whose walls were mostly of concrete bricks was 162 NIS. And the percentage

of dwellings with the majority of the walls of concrete bricks in the sample is 68%. Table 6 shows the measures of central tendency and dispersion measurements.

To test whether there are differences of statistical significance in the expenditure on electricity according to the predominant material used in building the outer walls of the house.

$$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 \quad H_A: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5$$

From Table 7, we find that $P = 0.000 < \alpha$ and therefore we reject null hypothesis, which shows that there are statistically

significant differences in expenditure on electricity according to the predominant material used in the construction of external walls.

It is noted that dwellings with most of the walls of clean stone are the most spending on electricity, while there are no statistical differences between the average expenditure of electricity between houses with external walls of clean stone and houses with walls of stone and cement. On average, less spending on electricity is in dwellings with most of its exterior walls of concrete.

To further illustrate the expenditure on electricity by the predominant material used in the construction of external walls, electricity expenditure was divided into groups, starting from NIS 50 per month and ending with NIS 400 per month, an increase of NIS 50 per group. Figure 3 illustrates this.

From Figure 3, the dwellings that use clean stone, stone and cement, old stone, concrete bricks, concrete in construction and spend on electricity <200 shekels, were 63.2%, 70.6%, 73.4%, 82%, 87.2 % respectively.

**Table 4: Statistical description of expenditure on electricity by type of population**

| Type of population | % in the sample | Min. | Max. | Mean | Variance |
|---|---|---|---|---|---|
| Urban | 53 | 10 | 940 | 176 | 10730.1 |
| Rural | 26 | 25 | 700 | 165 | 7731.75 |
| Refugee camps | 21 | 30 | 600 | 172 | 7859.94 |

The table was calculated by the researcher based on the data of the household expenditure and consumption survey 2011

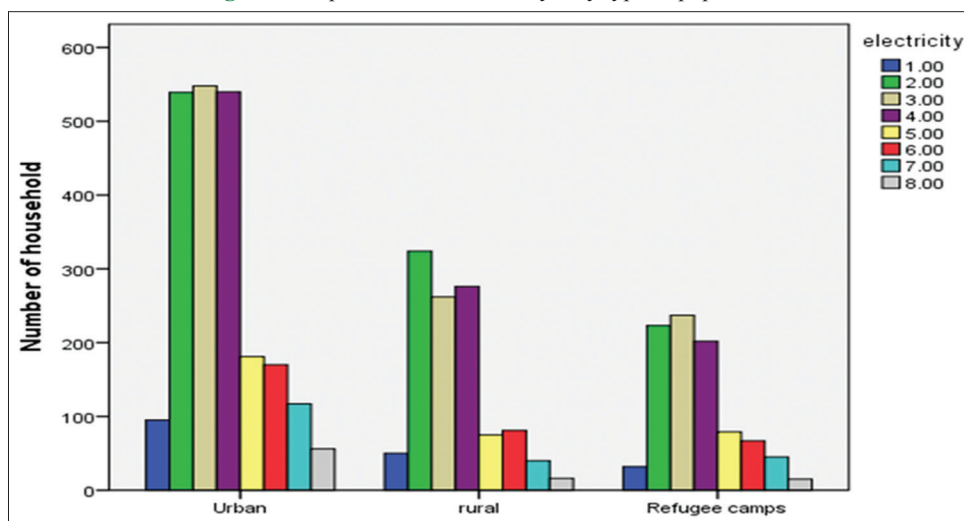**Figure 2:** Expenditure on electricity bwy type of population



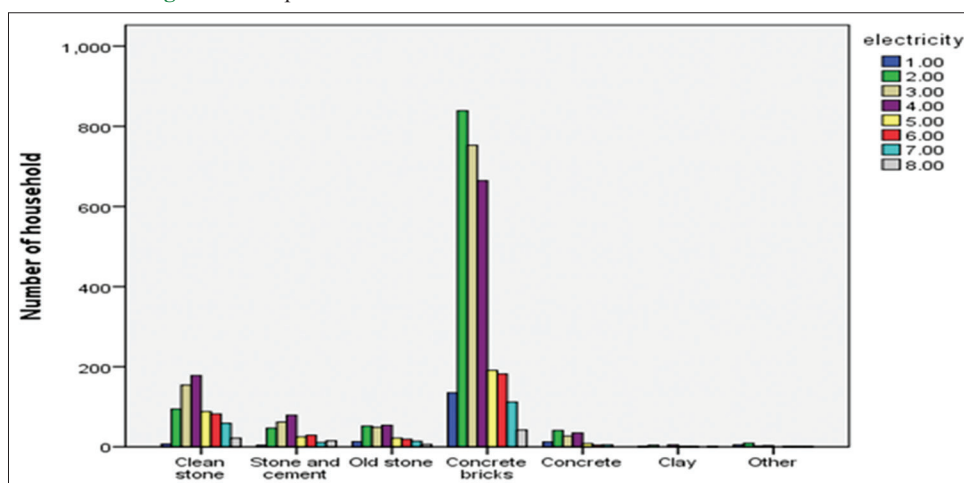**Figure 3:** The predominant material in the construction of external walls

**Table 5: Multiple comparisons**

| Type of population (I) | Type of population (J) | Mean difference (I-J) | Sig. |
|---|---|---|---|
| Urban | Rural | 11.39 | 0.001 |
| | Refugee camps | 4.08 | 0.284 |
| Rural | Urban | −11.39 | 0.001 |
| | Refugee camps | −7.31 | 0.091 |
| Refugee camps | Urban | −4.08 | 0.284 |
| | Rural | 7.31 | 0.091 |
| F- statistic between groups | 5.212 | | |
| Prob (F.stat) between groups | 0.000 | | |

Dependent variable: LN (EXPEN_ELECTRICITY). The table was calculated by the researcher based on the data of the household expenditure and consumption survey 2011

**Table 6: Statistical description of expenditure on electricity by the predominant material in the construction of external walls**

| The predominant material in the construction of external walls | % in the sample | Min. | Max. | Mean | Variance |
|---|---|---|---|---|---|
| Clean stone | 16 | 50 | 800 | 209 | 10487 |
| Stone and cement | 6 | 20 | 800 | 202 | 13567 |
| Old stone | 5 | 20 | 800 | 179 | 10955 |
| Concrete bricks | 68 | 10 | 940 | 162 | 8158 |
| Concrete | 3 | 13 | 340 | 149 | 4745 |

The table was calculated by the researcher based on the data of the household expenditure and consumption survey 2011

**Table 7: Multiple comparisons**

| The predominant material in the construction of external walls (I) | The predominant material in the construction of external walls (J) | Mean difference (I-J) | Sig. |
|---|---|---|---|
| Clean stone | Stone and cement | 6.78 | 0.318 |
| | Old stone | 29.24 | 0.000 |
| | Concrete bricks | 46.90 | 0.000 |
| | Concrete | 60.05 | 0.000 |
| Stone and cement | Stone and cement | −6.78 | 0.318 |
| | Old stone | 22.45 | 0.008 |
| | Concrete bricks | 40.12 | 0.000 |
| | Concrete | 53.26 | 0.000 |
| Old stone | Clean stone | −29.24 | 0.000 |
| | Stone and cement | −22.45 | 0.008 |
| | Concrete bricks | 17.66 | 0.007 |
| | Concrete | 30.81 | 0.003 |
| Concrete bricks | Clean stone | −46.90 | 0.000 |
| | Stone and cement | −40.12 | 0.000 |
| | Old stone | −17.66 | 0.007 |
| | Concrete | 13.14 | 0.119 |
| Concrete | Clean stone | −60.05 | 0.000 |
| | Stone and cement | −53.26 | 0.000 |
| | Old stone | −30.81 | 0.003 |
| | Concrete bricks | −13.14 | 0.119 |
| F- statistic between groups | 29.239 | - | - |
| Prob (F.stat) between groups | 0.000 | - | - |

Dependent variable: LN (EXPEN_ELECTRICITY). The table was calculated by the researcher based on the data of the household expenditure and consumption survey 2011

In addition, the houses that use clean stone, stone and cement, old stone, concrete bricks, concrete in construction and spend more than 300 shekels on electricity were 11.8%, 9.5%, 8.7%, 5.2%, 3.8% respectively.

# 5. RESULTS AND RECOMMENDATION

To determine the effect of study variables on electricity expenditure in Palestine, the least squares method was used to estimate equation (1) coefficients, and Table 8 shows regression results.

Table 8 shows that the number of rooms in the dwelling, the number of bedrooms, monthly income, total expenditure on goods and services, and the number of family members are positively correlated with spending on electricity in housing.

When the number of rooms in the dwelling increases by 1%, electricity expenditure increases by 9.8%. Electricity expenditure increases by 9.1% when the number of bedrooms in the dwelling increases by 1%. This is due to the additional need for lighting, heating and cooling in each room increase in housing.

Table 8 shows that spending on electricity increases by 4.9% when monthly income increases by 1%. This can be explained by the economic theory; When the income increases, the spending increases on the normal goods, while electricity expenditure

**Table 8: Regression results**

| Variable | Coefficient | Standard error | t- stat | P-value |
|---|---|---|---|---|
| LN_num_room | 0.098 | 0.024 | 4.009 | 0.000 |
| LN_num_bedroom | 0.091 | 0.025 | 3.606 | 0.000 |
| LN_Monthly_income | 0.049 | 0.012 | 4.163 | 0.000 |
| LN_TOT_EXP | 0.321 | 0.015 | 21.835 | 0.000 |
| LN_num_family | 0.042 | 0.016 | 2.711 | 0.000 |
| Intercept | 1.718 | 0.086 | 20.079 | 0.000 |
| Observation | 4270 | | | |
| $R^2$ | 0.31 | | | |
| Adjusted $R^2$ | 0.31 | | | |
| F- statistic | 383.867 | | | |
| Prob (F-statistic) | 0.000 | | | |

Dependent variable: LN (EXPEN_ELECTRICITY). The table was calculated by the researcher based on the data of the household expenditure and consumption survey 2011

increases by 32.1% when total expenditure on goods and services increased by 1%. This increase can be explained by the fact that spending on goods and services (tools and electrical appliances) is accompanied by increased spending on electricity.

Table 8 shows that the increase in the number of household members by 1% leads to an increase in electricity expenditure by 4.2%, due to the increase in the number of individuals, the use of different electrical appliances will increase.

While the results of the analysis showed that the average monthly expenditure of Palestinian households on electricity is 172 NIS, knowing that the average number of members of the Palestinian family is 6 individuals. Total expenditure on goods and services was found to be the most influential variable on electricity expenditure.

At the population level, the average urban expenditure on electricity was more comparable to rural areas and refugee camp areas. This can be explained by the fact that urban areas rely heavily on electricity, and there are no alternatives to heating and cooking, as in rural areas and camps.

Whereas the average expenditure on electricity in the middle of the West Bank is the highest compared with the north and south of the West Bank and Gaza Strip. This can be explained by the fact that the central West Bank is the highest average income, leading to an increase in electricity expenditure as a normal commodity.

As for the type of material used in the construction of external walls, the results of the analysis showed that the houses that use concrete in the construction of external walls are the lowest expenditure in electricity, this can be explained by the fact that the concrete material is more soluble for heat and cold than other materials in construction, thus reducing the use of electricity in heating and cooling.

Among the above, several recommendations can be made. The most important of these are the creation of awareness-raising programs in the consumer behavior of citizens to rationalize the consumption of electricity and to concentrate on the central areas of the West Bank because they are the most expenditure on electricity. In addition to the implementation of programs to contribute to reduce the number of rooms in the housing, including the construction of discounts for building permits housing that includes <4 rooms in the house. In addition to encouraging construction using concrete for external walls, they have a role in heat insulation.

## 6. ACKNOWLEDGMENTS

## REFERENCES

Al-Qunaibet, M. (1989), Estimation the demand function for an economic resource: Electricity. King saud university press. Agricultural Science, 1(1), 5-22.

Blázquez, L., Nina, B., Massimo, F. (2012), Residential Electricity Demand in Spain: New Empirical Evidence Using Aggregate Data. CEPE Working Paper No. 82.

Filippini, M., Pachauri, S. (2004), Elasticities of electricity demand in urban Indian households. Energy Policy, 32(3), 429-436.

Keith, B., Rylatt, M. (2007), Improving the prediction of UK domestic energy demand 9 Using annual consumption data. Applied Energy, 85, 475-482.

Khattak, N.U.R., Tariq, M., Khan, J. (2010), Determinants of households demand for electricity in district Peshawar. European Journal of Social Sciences, 14(1), 7-16.

Musa, O., Zaanan, A.I. (2012), The use of some statistical methods to predict the consumption of electricity in Saudi Arabia. Journal of Economic Sciences, 8(29), 261-297.

Palestinian Central Bureau of Statistics, PCBS. (2013), Household Energy Survey: Main Results. Ramallah, Palestine: Palestinian Central Bureau of Statistics.

Seung-Hoon, Y., Lee, J.S., Kwak, S.J. (2007), Estimation of residential electricity demand function in Seoul by correction for sample selection bias. Energy Policy, 35(11), 5702-5707.

Sidra, A., Abdullah, S.D., Sajal, G. (2009), Demand for electricity in Lebanon. International Journal of Economics and Business, 8(1), 11-18.

Taweel, F. (2013), Estimating Households Demand Function on Electricity Consumption in Palestine, Case Study: Gaza Strip (2000-2011). Master Thesis. Islamic University.