



## Evaluation of Domestic Energy Preference in Nigeria Cities: a Case Study of Warri, Benin, Port Harcourt, and Calabar

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PAPER INFO	ABSTRACT
<p><b>Chronicle:</b> Received: 18 October 2020 Reviewed: 06 December 2020 Revised: 20 February 2021 Accepted: 29 February 2021</p>	<p>The significance of energy in human lives cannot be overemphasized. It is crucial to all facets of economic growth, progress, and development as well as poverty eradication and security. Household energy is generally required for a variety of purposes. It is required for lighting and heating. This study evaluated domestic energy utilization in major Nigeria cities using Warri, Benin, Port Harcourt, and Calabar as a case study. A total of four locations with the highest population were targeted at each selected city. Responses were randomly selected from energy utilization in the selected region. A total of 1439 questionnaires were administered all through the selected cities in this study. Data obtained were evaluated using descriptive statistic. The result obtained revealed that kerosene has the highest percentage of utilization (88%), LNG (68.9%), electricity (67.7%), PMS (67.1), diesel (5.6%), charcoal (16.4%), wood (28.2%), and solar (3%) within these cities. Therefore, kerosene is the most preferred energy and this can be as a result of cost when compared to LNG, electricity, PMS, diesel, charcoal, solar, and wood fuel.</p>
<p><b>Keywords:</b> Energy Utilization. Descriptive Statistics. Kerosene. Percentage Utilization. Household Energy.</p>	

### 1. Introduction

Energy can be classified into solid fuels and non-solids fuel. The solid fuel includes fossil fuel (coal, peat) and biomass (wood, dungs and agricultural product) while the non-solid fuel consists of kerosene, liquefied natural gas (LNG), etc. [1]. Household energy is the energy utilized for domestic purposes. Domestic energy usage is generally influence by various factors that include standard of living of the country, climate, residential type, occupants' age, and education level [2]-[4]. Increase demand for energy consumption has adverse effect on the income of individual and this has resulted to high amount of money spent on energy utilized [5]-[7]. More so, high demand for biomass fuel have led to an increase in deforestation at a rate of about 400.000 hectares per year [8]. If this trend continues, the country forest resources could be completely depleted [9]. Besides, the looming exhaustion of energy sources,

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incessant power supplies, and the quest to meet the growing sustainable energy demand for the global population had been a huge motivation factor for research attention [14] and [15].

Energy is a key factor to human activities and it is quite critical to social and economic development. Energy is one of the basic input in production process and is a key factor in developing nations [16]. The importance of energy in human lives cannot be overemphasized; it is central to all aspects of economic growth, progress and development as well as poverty eradication and security [12]. It is a vital commodity that is requires for the existence of modern household living [13] and [14]. It is recognized that energy play a significant role in the economic development of a country as it improves the productivity of the nation. As a result of the nature of most developing nations and because of inadequacy of understanding of domestic dynamic and other factors influencing it dynamism, it is difficult to fully identify the impact of insufficient energy utilize on the development of the various region in the country and the standard of living of the people.

Furthermore, there is a problem in designing policies intended to address the impact of the use of energy within this sector. Also, reliability and affordability of energy is a major challenge in this region. In Nigeria, energy use in the domestic sector account for more than 60% to final energy utilize [10]. Most of these energy is utilized for domestic activities such as cooking, lighting and home electrical appliances. A century ago, the problem of household energy demand was not common as Nigerians were mostly engage in farming and the population growth was very small. Technological advancement was not well visible and the modern equipment which use exorbitant energy were not discovered in Nigeria. Utilization of energy is increasing drastically in Nigeria cities with respect to increasing human population and higher living standard with negative impacts on the environment. This study therefore tends to evaluate the current trends in domestic energy utilization in selected cities within the Southern part of Nigeria.

## 2. Research Methodology

The data used for this study was collected via direct interview and structured questionnaires. The data collected is based on the response from household energy utilized. The study was carried out in Warri, Benin, Port Harcourt and Calabar. These cities are located as Warri (5.5544N,5.793E), Benin (6.3350N,5.6037E), Port Harcourt (4.8156N,7.0498E) and Calabar (4.9757N,8.3417E) with a corresponding population of 814,000,1,727,000,1,865,000 and 579,000 respectively [11]. The reason for the selection of these cities were due to their high demand of energy. Kerosene which is commonly use among household have been a scare energy source. The scarcity is as a result of the subsidy removed by the Nigeria Federal Government (NFG). This on the other hand has resulted in high numbers of illegal mining of crude oil, a process commonly referred to as “Oil Bunkering” in the region. These illegal activities have led to pollution of the environment and loss of human lives.

## 3. Results and Discussion

The results of the summary of survey per selected cities are shown in *Table 1*.

**Table 1.** Summary of survey per city in southern Nigeria.

S/N	City	No. of Questionnaires Propose	No. of Questionnaires Utilized	Percentage
1	Warri	350	334	95.4
2	Benin	400	386	96.5
3	Port Harcourt	450	432	96.4
4	Calabar	300	285	95.0

Table 2 shows the outcome of the analysis of respondents on household energy utilization in Warri.

**Table 2.** Analysis of respondents on household energy utilization in Warri.

S/N	Location	No. of Respondent	Electricity	LNG	Wood Fuel	PMS	Kerosene	Diesel	Charcoal	Solar
1	Ugborikoko	84	45	53	40	35	75	0	42	0
2	DDPA	42	40	42	10	42	40	5	0	4
3	NPA Quarter	54	43	54	5	50	53	2	3	3
4	Niger Cat/Chickelly	154	113	120	45	87	130	4	23	2
	Total	334	241	269	100	214	298	11	68	9
	Percentage	100	72.2	80.5	29.9	64.1	89.2	3.3	20.4	2.7

Table 3 shows the outcome of the analysis of respondents on household energy utilization in Benin City.

**Table 3.** Analysis of respondents on household energy utilization in Benin city.

S/N	Location	No. of Respondent	Electricity	LNG	Wood Fuel	PMS	Kerosene	Diesel	Charcoal	Solar
1	Ugbowo	125	86	72	45	68	118	10	52	3
2	Sapele Road	86	72	53	36	76	82	5	33	0
3	Akpakpava	95	63	41	25	53	88	7	42	5
4	GRA	80	75	80	5	80	65	15	5	6
	Total	386	296	246	111	277	353	37	132	14
	Percentage	100	76.7	63.7	28.8	71.8	91.5	9.6	34.2	3.6

Table 4 shows the results of the analysis of respondents on household energy utilization in Port Harcourt.

**Table 4.** Analysis of respondents on household energy utilization in Port Harcourt.

S/N	Location	No. of Respondent	Electricity	LNG	Wood Fuel	PMS	Kerosene	Diesel	Charcoal	Solar
1	Diobu	125	68	88	35	86	112	6	10	5
2	Rukpokwu	127	72	76	28	83	98	3	7	4
3	Woji Estate	86	46	37	15	67	76	2	9	0
4	GRA Phase 1-5	96	43	72	18	53	83	5	8	3
	Total	434	229	273	96	289	369	16	34	12
	Percentage	100	52.8	62.9	22.1	66.6	85	3.7	7.8	3.0

Table 5 shows the results of the analysis of respondents on household energy utilization in Calabar.

**Table 5.** Analysis of respondents on household energy utilization in Calabar.

S/N	Location	No. of Respondent	Electricity	LNG	Wood Fuel	PMS	Kerosene	Diesel	Charcoal	Solar
1	State Housing	56	43	42	15	48	53	4	6	3
2	Federal House	67	51	46	21	38	62	2	10	0
3	Satellite Town	82	58	69	28	57	65	3	12	2
4	Etta Agbo	80	56	46	35	43	71	2	8	2
	Total	285	208	203	99	186	251	11	36	7
	Percentage	100	73	71.2	34.7	65.3	88.1	3.9	12.6	2.5

Table 6 shows the summary of the analysis of respondents on household energy utilization in the Nigeria cities.

**Table 6.** Summary of analysis of respondents on household energy utilization in the selected cities.

S/N	Location	No. of Respondent	Electricity	LNG	Wood Fuel	PMS	Kerosene	Diesel	Charcoal	Solar
1	Warri	334	241	269	100	214	298	11	68	9
2	Benin City	386	296	246	111	277	353	37	132	14
3	Port Harcourt	434	229	273	96	289	369	16	34	12
4	Calabar	285	208	203	99	186	257	17	36	7
	Total	1439	974	991	406	966	1277	81	236	42
	Percentage	100	67.7	68.9	28.2	67.1	88.7	5.6	16.4	3

Table 7 shows the income level of respondents in relation to their choice of household energy utilization in the four southern cities.

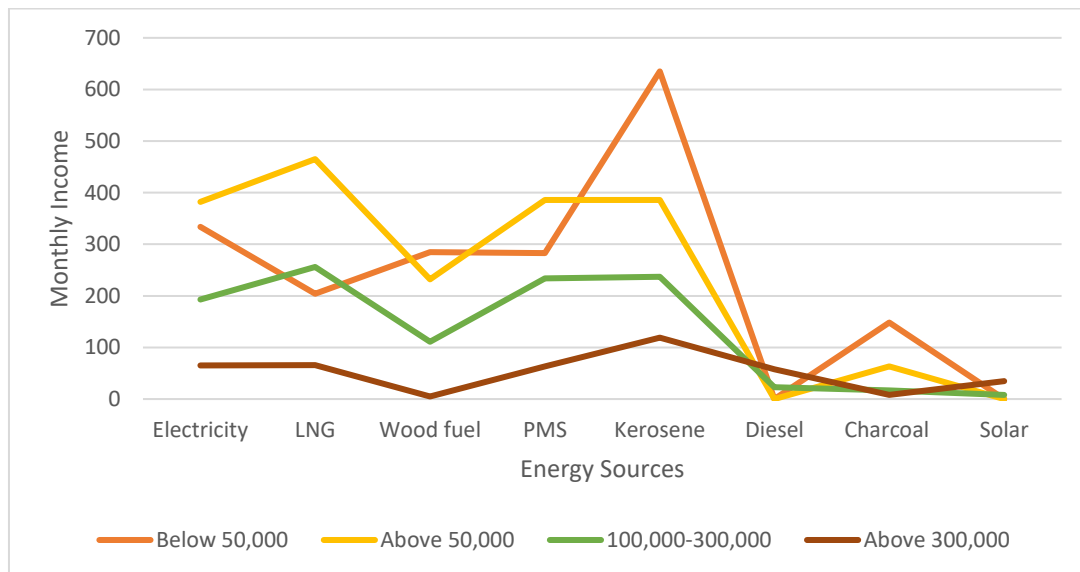
**Table 7.** Respondent income level in relation to their choice of household energy utilization in the selected cities.

S/N	Monthly Income (₦)	No. of Respondent	Electricity	LNG	Wood Fuel	PMS	Kerosene	Diesel	Charcoal	Solar
1	Below 50,000	652	334	204	285	283	635	0	1486	0
2	Above 50,000	465	382	465	232	386	386	0	63	0
3	100,000-300,000	256	193	256	111	234	237	23	17	8
4	Above 300,000	66	65	66	5	63	119	58	8	35
	Total	1439	974	991	406	966	1277	81	236	42
	Percentage	100	67.7	68.9	28.2	67.1	88.7	5.6	16.4	3

As shown in Fig. 1 is the graphical analysis of respondent income level in relation to their energy preference while Fig. 2 shows the respondent analysis on household energy utilization in selected cities of Nigeria. From the analysis, kerosene with 88.7% (Table 7) is widely used in the selected cities used for this study. There was a continuous reliance on the use of kerosene and this was due to the relatively low cost of the product when compared to other products used in this study. The price of kerosene varies

around at a very low price of ₦120 per litre which is relatively cheaper than LNG and electricity as an energy for household usage. The removal of subsidy by the government from kerosene have led to an increase in illegal mining (Oil bunkering) of the product in region. Besides, 68.9% respondents indicated their preference for LNG as their primary energy usage. Thus, there is a high demand of LNG as a domestic energy source among cities dweller in this present day as compared to decade ago. This further affirm the fact that users over the years have been enlighten on the superior nature of this energy source. Also, the use of LNG as household energy is faster and more convenient when compared with other cooking energy sources.

Furthermore, for electricity (67.7%), PMS (67.1%) and diesel (5.6%), findings from the study suggest electricity source is in high demand. Although, Nigeria power generation and Distribution has been a major problem in the energy sector over the years which the Government has failed to improve on. Most areas in these cities have an average of four (4) hours supply of electricity daily, and this has led to high demand of PMS and diesel in order to meet up with daily energy needs. Diesel has the lowest percentage from the respondents' analysis, and this is attributed to the high cost of running diesel generators compared to PMS power generators. More so, there is a high demand of biomass fuel (charcoal=16.4%, wood = 28.2%) as shown in *Table 7*.



*Fig. 1. Graphical analysis of respondent income level in relation to their energy preference.*

#### 4. Conclusion

The outcome of this study shown that kerosene is the most preferred energy sources in selected cities in Nigeria and this was basically due to the fact that it is not only relatively cheap but also affordable. Therefore, government must improve on policy to increase availability of these energy source. Also, poverty is a major factor that have alleviated sustainable energy. Thus, government should improve on the standard of living of its citizens. Renewable energy such as solar power and others should be encourage and maximized by the government by supporting local manufacturing of these equipment. This can be achieved through provision of credit grant from the government for indigenous technology.

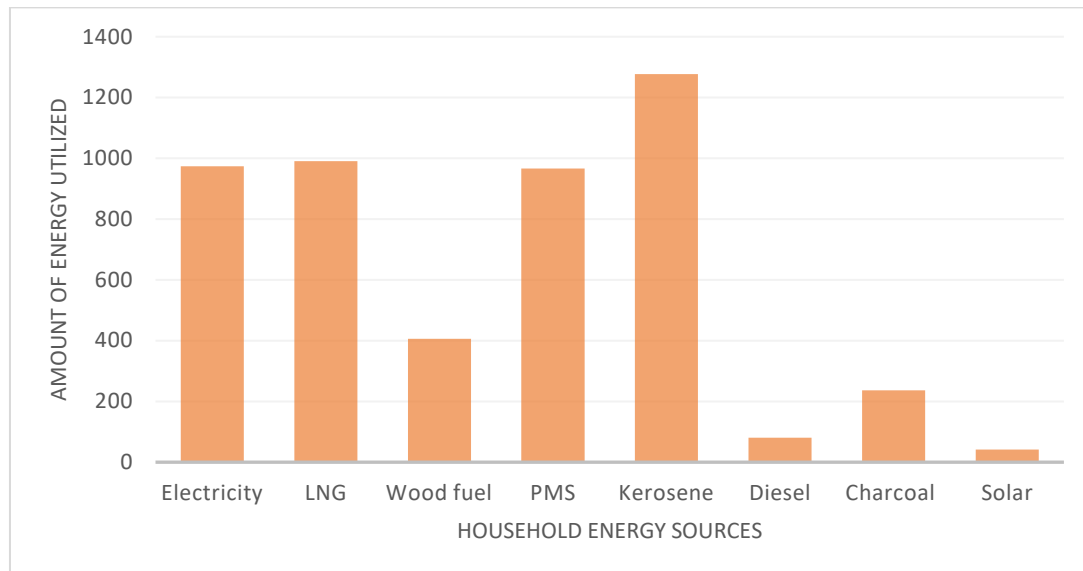


Fig. 2. Respondent analysis on household energy utilization.

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