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Abstract
This paper examines the determinants of households energy demand and energy use in order to provide useful information on energy consumption pattern of Mubi metropolis in Adamawa State – Nigeria. The paper explore various energy sources such as traditional biomass, wood fuel, kerosene, LPG, solar, wind, and electricity and the willingness of the households to shift from one energy source to the other. Secondary sources of data were used extensively for this work and the data were collected from Yola Electricity Distribution Company Mubi branch (YEDC, Mubi) and NNPC depot Yola. The study utilizes econometrics methods of regression analysis and findings from the results shows that energy is the key factor to the welfare of the households and individual energy consumption majorly depends on households' income and energy prices. This paper reveals that previous studies use limited economic models for analysing household energy consumption pattern which limits its scope of analysis. The paper suggest that there is a need to make a general awareness in Mubi on the importance of using clean energy sources like; LPG and Electric Cookers which improve health and non-hazardous because of the fact that negative relationship exist between household's energy consumption and energy price.

Keywords: Energy, Demand, Household, Willingness to Pay, Kilo Watt per Hour, Mega Watt

Introduction
Energy is so complex that it might not be possible to give a comprehensive definition and explain all its features in a single shot. In 1981, Maxwell in Idris [9] wrote: "energy is the capacity of doing work." Also Lapedes (1976) in [9] opined that "energy is the mainspring that keeps life's clock ticking on earth and it is present in many forms. It is in the heat and light radiated by the sun, in the carbohydrate and wood in plants, in coals, oil, natural gas and oil shade and tar sands, in geothermal wells, in the winds that sweep over the lands and sea, in the waters of oceans and in the atomic nucleus." Similarly, Won (1978) in [9] viewed energy as an input for economic process and as an intermediate good and adds that economic development has gone hand in hand with increased energy use per capita beginning in history with solar energy which is embodied in plants and animals and continuing through draught animals, wind energy and fossil fuel. He also stated that energy inputs always produces some measures of pollution since waste products occur alongside with desired goods. Cunningham and Cunningham [5] said "energy is the capacity of doing work, such as moving matter over a distance. They added that energy can be in different forms such as heat, light, electricity and chemical energy. Ayodele [1] observed that the socio economic development trend in the world reveals that the way of life of contemporary civilization is based on large and regular supplies of energy like electricity and gas for cooking. Fawibe [7] held that any modern society will not be seriously addressing the issue of development if such considerations are not based on the foundation of adequate and continuous supply of energy.

Individual household's energy demand and her willingness to pay for improved/clean energy can be figured via her knowledge on various fuel influences, choice, and substitutions decisions. The household's knowledge on alternative fuels influences its fuel choice and decisions to shift to the clean sources. However, households energy demand is largely affected by both economic and noneconomic factors, non-economic factors encompasses

knowledge and awareness such as; family size, gender, type of dwelling, settlements and access to modern energy.

Nigeria has been periods of extended energy crisis with high negative impact which has retarded growth in GDP and economic progress including poor standard of living amongst her citizenry. There is high energy shortage e.g. petroleum products (like kerosene and cooking gas). Since 1975, there had been erratic electricity supply and disruption in the coal production during and after the civil war. The endemic nature of energy problems in the country has disrupted major economic activities especially in the industrial, health, education and household sectors of the economy. In the household sector for instance, per capita consumption varies widely between the urban and rural areas and between the low income and high income earners respectively. According to [17], majority of the rural dwellers and the low income earners use firewood and other traditional fuels which are highly inefficient and hazardous. The questions are what are the sources of energy to households in Mubi? What are the determinants of energy availability and consumption by households in Mubi? Why do low income earners don't have access to clean energy as their rich counterpart? These are the questions this study will attempt to answer. The objective of this study therefore, is to find out the sources of energy to household in Mubi. To examine how the levels of income influence households' access to and consumption of clean and efficient energy sources and to suggest ways as to how clean energy can be made more available to households for enhanced welfare. For this purpose, this paper is divided into five sections. The first section is the introduction, the second section is the literature review, the third section is the methodology, the forth section discusses the result of the study and the fifth section concludes the work.

Review of related literature

Nigeria is endowed with vast oil and gas reserves (fossil fuel) and abundance of renewable energy potentials. Yet the country is still suffering from energy crisis which has a major impact on its ability to reduce poverty and achieve the sustainable development goals (SDGs.) there are abundant sources of energy in Nigeria both fossil fuel and renewable energy resources.

Cooking is the primary energy consuming activity in the majority of third world homes in both the rural and the urban dwellers. According to [9] results from a survey conducted by Gupta, Rate and Vasudeva in 1980 in India showed that over 70% of total energy use in both low and middle income households as well as high income groups went for cooking. In the same year in China, Morgan observed in three (3) cities that even higher share of energy use went for cooking. Availability of fuels is said to play a significant impact in shaping the quality of life of households, whereas lack of clean energy has a serious negative impact on the quality of life of households. Sambo [17] observed that mostly in rural areas, the major source of energy apart from human and animal power is fuel wood. However, Akinbole (1988) cited in [9] noted that the supply of fuel wood in Nigeria is very difficult to quantify since there are many competing uses for wood. Where firewood is free or it is obtained at low cost, it tends to be used for reasons of both cost and habit. The scarcity of wood especially in Adamawa State and other northern states contribute to the shift away to charcoal like substance popularly called Gawayi which is a major cooking fuel amongst the low income earners in Adamawa State.

According to Sambo [17], only 10% of the rural households and 30-40% of the country's total population has access to electricity. This implies that an estimated 60-70% of the Nigerian population does not have access to electricity. The energy sector in Nigeria totally relies on government subsidized fuel and funding of major energy plants and energy capital projects by the Federal and State governments and governmental agencies. People have adopted energy to a wider range of personal and industrial uses. The most significant personnel (household) uses are for: cooking, heating, lighting, cooling comfort and illumination to mention just a few. However, urbanization has brought with it a transition from traditional forms of energy to modem ones. The growth in income that has taken place in urban areas has also facilitated growth in demand for new energy services such as electric lighting, cooking with liquefied petroleum gas (LPG), kerosene, refrigeration, air conditioning and personal vehicles for transportation in which the reverse is the case in the rural households. Therefore, per capita consumption of energy varies widely between the household sector and commercial sector, being particularly higher in commercial sector. Also that per capita consumption of energy varies amongst different countries, being particularly lower in the poorer countries as compared to industrialized ones. They further stated that both the household and the industrial sectors demands have outstripped growth in power generation capacity and there is acute shortage of electricity and fuel. However, due to adequate and constant available and supply of power, per capita consumption of energy is invariably higher in the industrialized countries. The reasons for this imbalance according to Ramsey (1984) as cited by [9] are related to the mix of fuels used by households at different levels of income. Variations in households energy use is also affected by fuel price. The higher share of firewood in many countries for instance is related to the fact that much of it is gathered free of charge by family members as noted by Dunkerly [6, 9]. A major factor therefore influencing the mix of fuels consumed in developing countries is supply constraints conditions. Many households in rural areas of Adamawa State do not have access to a wide range of modern fuels.

Therefore access to clean cooking, lighting and heating energy amongst other become necessary for the welfare of the households of modem civilization. Although, it has been observed that access to clean energy electricity and cooking gas is influenced by a number of factors mostly prices of fuels and income of households. Hertberg [8] added that the cost of purchasing energy is one of the most important interactions between energy and welfare. The pricing of modern energy is often politicized. That there are many examples from a variety of countries where energy pricing reforms meet stiff resistance, sometime causing those reforms to be cancelled, reversed or altered. The reason is basically the non-negligible share of energy in households' budget combined with its role as basic households good; fuel for lighting and cooking are nearly impossible to live without [8]. A high budget share for energy services translates into vulnerability to price fluctuations. In Nigeria (Adamawa State for instance), where households have shifted from the use of wood fuel, their vulnerability to fuel price fluctuations is increased. The cost of cooking is a

function of the price of cooking fuels and the cost of devices to use them example gas and gas cooker cost, influence fuel choice in households.

The energy ladder hypothesis is one of the most common conceptualization of energy use dynamics among households. It postulates that low income households generally use traditional stoves and cooking fuels such as animal dung, charcoal and wood, while those households with higher income use modern cooking technology (Baldwin; Smith; Leach [2]. Furthermore, the literature on household energy demand and choice has shown that households in transition (that is, those between low income and high income) consume transition fuels; higher income households consume energy that is cleaner and more expensive such as liquefied petroleum gas and electricity [3, 8].

Empirical evidences based on energy demand studies reveal that both energy ladder hypothesis and fuel stacking hypothesis have been confirmed. For example, Rajmohan and Weerahewa [15] investigated household energy consumption patterns of urban, rural and estate sectors in Sri Lanka. The results showed that the energy ladder hypothesis holds for Sri Lanka and the country as a whole is moving towards modern fuels such as liquefied petroleum gas (LPG) and electricity. The urban sector proceeds much faster than the rural sector.

Mc Konnen and Kohlin [13] examined that determinant of household fuel choice and demand in major Ethiopian cities. The study found widespread use of multiple fuels for a particular purpose (such as cooking) suggestive of fuel stacking rather than energy ladder. The evidences show that higher kerosene prices made households choose either solid fuels (charcoal and wood) only or a mix of solid and non-solid fuels (wood, charcoal, kerosene and electricity).

Pachauri and Spreng [15] observed that access to more efficient energy sources implies high level of energy consumption associated with enhanced level of energy use which will generate other benefits such as improved indoor air quality. More time for productive or recreational activities and time freed from collecting biomass energy. It is instructive to note that access alone does not provide sufficient that can be used to draw conclusion regarding well-being. For instance, some households that use only biomass and other less efficient energy sources but use sufficient quantities of these sources might be considered better-off than others that have access to more efficient energy sources but cannot consume adequate amounts of such efficient energy sources.

Jackson [11] showed that the number of people living on less than $2 per day tends to decrease sharply when access to electricity is guaranteed. The study found a strong correlation between modern energy consumption and Gross National Product (GNP) per capita. Indeed it showed that GNP tends to increase rapidly as commercial energy use per capita increases, mainly for low income countries. When the country reach a high level of per capita GNP, factors such as efficient utilization of energy by industries, energy production and transformation systems tends to make the difference for economic growth to continue so that more energy consumption for a country no longer implies more income for the country.

Barnes *et al.* [3] found that the use of both traditional (biomass energy burned in conventional stoves) and modem (electricity and kerosene) sources improve household consumption and income; the return on modern sources is 20 to 25 times higher than that on traditional sources. In addition, after comparing alternate measures of the energy poverty line, they observed that some 58% of rural households in Bangladesh were energy poor compared to 45% that were income poor. The findings implied that growth in electrification and adoption of efficient cooking stoves for business use can lower energy poverty in a climate-friendly way by reducing carbon dioxide emissions. The study concluded that reducing energy poverty helps in reducing income poverty as well.

Moreover, from various literature reviewed, it was shown that not all factors have equal important in determining the pattern and behavior of household energy consumption for different areas due to differences in socio-economic settings, environmental factors, and cultural factors as well as the average level of development in the area. This (i.e. differences in study area) has led to the arrival of different and inconsistent conclusions in the literature of household energy consumption behavior.

Sources of Energy in Nigeria

Nigeria is favorable enough to possess almost all the sources of energy currently important in international economics. These sources of energy in Nigeria can be grouped into; Non Renewable and Renewable Energy Resources

a) Non-Renewable Energy Resources

I) Crude Oil: Crude oil or petroleum is a form of fossil fuel that is formed from decomposing plants over millions of years ago [11]. It is trapped between layers of rock and it can be made into gas, petrol kerosene, diesel, oils and bitumen. These products are used for heating, cooking and lighting and in factories as a source of heat energy. They are also used by power stations and to provide fuel for transport amongst other uses.

Crude oil in Nigeria was first discovered at Araromi in the present day Ondo State in 1908 by a German company called German Bitumen Corporation but outbreak of the 1st world war disrupted their activities. Exploration continued in 1937 by Shell D'Arcy which later became Shell BP Petroleum Development Company of Nigeria. They were also disrupted by the outbreak of the 2nd World War in 1939.

In 1956, oil was discovered in commercial quantity at Oloibiri in the Niger-Delta area by Shell BP. It was until 1958 when commercial production of oil began with an output of 5100 barrels per day. Idris [9] noted that oil production in Nigeria started with an output of 5100 barrels per day in 1958 and rose to 2.3 million bpd in 1979. According to [4] Nigeria's crude oil production (including condensates) was 660,559 million barrels in 1990.

Today, oil is the most dominant source of commercial energy in the country. Nigeria is the largest producer of oil in Africa has proven reserves of 32 billion barrels of oil [10]. He added that there is production target of 4 billion barrels per day from reserve base of 40 billion barrels. Petroleum has also become the major source of export commodity in Nigeria constituting as high as 98.8% of the total exports in 1984 [9]. It is also the major exchange earner of the country's economy i.e. 26.3% in 1970, 87% in 1970 and about 89% in 2009 of the total government revenue.

II) Gas: According to [12], gas is made in the same way as petroleum and it is trapped between layers of rock. Natural gas is trapped, compressed and piped into homes to be used

in stoves and hot water system. Liquefied petroleum gas is made from crude oil and it can be used for cooking and heating in homes, industrial heating in boilers, kilns and furnaces [12]. It can be used as an alternative to petrol as an engine and transport fuel.

Nigeria has abundant reserves which in energy terms are equivalent to its oil reserves. These reserves exceed the foreseeable needs of domestic, regional and international markets for gas [10] indeed, the country is yet to tap fully or even 50% of its gas reserves and it is likely to increase over time. According to [10], the challenge in the gas sector is to generate value from these gas reserves. Ogunsola (2003) held that Nigeria has about 165 trillion cubic feet of gas reserves or 32 billion barrels of oil equivalent in energy terms, being the 7th largest proven gas reserves in the world and the first in Africa.

III) Wood Fuel (Firewood): wood are the most dominant source of fuel for both the rural and the urban populace of Nigeria. The share of ground to the total energy use of the world was put at 82% in the early 1980s [9]. Most Nigerians demand for wood fuel to use it for cooking, heating, amongst other uses. Dine 1'

Gole (1990) as observed in [9] held that with increased urbanization, domestic consumption in the urban areas is getting closer to that of the rural areas. Arid with depletion of the drier parts of Nigeria (northern parts e.g. Adamawa State), firewood is getting scarce and expensive'.

Isola [10] said "the annual consumption of wood is Nigeria is estimated to be between 51 and 88 million cubic meters of which 80% is consumed as firewood by the rural dwellers. He added that kerosene and liquefied petroleum gas (LPG) are popular cooking fuels in the urban and semi-urban areas. Though during acute shortages with corresponding price hikes, many urban populace also switch to wood fuel.

IV) Coal: coal deposits were first discovered in 1909 (one year after oil was discovered) near Udi in the lower Niger basin. These discoveries were occasioned by intensive geological surveys of the area around Enugu State, which led to the opening of the Udi coal mines in 1915. After some years, coal was also discovered in Anambra, Plateau and Benue State. To [10] coal is one of the most important non-renewable energy sources in Nigeria after gas and crude oil.

It has been estimated that coal mines in Nigeria could last 900 years with production of 25 million tons per annum. Presently, only 25 million tones, representing just 2% of coal reserves have been mined. In terms of efficiency, coal is less preferred to oil and gas because it emits more carbon dioxide on burning than oil and gas. Also it is bulky to transport to other areas.

b) Renewable Energy Resources in Nigeria

These are energy resources that can be renewed over time after putting them to use. They include hydropower, solar energy, wind energy, and biomass energy, etc.

I) Hydro energy or hydro-electricity power: is the energy that is derived from water e.g. dams and rivers etc. According to a national energy policy documents, the hydropower potentials of Nigeria is high and equivalent to about 32% of total installed grid connected electricity generation by early 1999. Also the potential for hydropower development in the country is estimated to be between 20,000 to 30,000 MW. The hydroelectric potential of Nigeria is currently concentrated on the River Niger and River Benue, both having important tributaries which train large catchment areas. Other potential sites of hydropower are Kaduna River, a tributary of River Nigeria, Cross-River in the east [10]. Hydro-electric power stations of the National Electric Power Authority (NEPA) now Power Holding Company of Nigeria (PHCN) are the Kainji, Jebba and Shiroro stations with installed capacity to generate 760,578 and 600 MW of electricity respectively. The Nigerian Electricity Supply Company (NESCO) ltd in Plateau State also operates 7 small hydroelectric power stations with capacity to generate a total of 30MW which supplements PHCN power supply in Plateau State. Also recently in Lagos State a hydroelectric power was set to supplement PHCN in Lekki through an independent power project.

II) Solar Energy: The energy from the sun is transmitted radically as electric magnetic radiation commonly known as solar energy or sunshine. This energy is radiated at the rate of about 3.8 x 10 kilowatt per hour (KWH) and it is estimated that Nigeria receives 5.08 x 10 KWH of the energy per day from the sun [10]. According to [17], if solar appliances with 5% efficiency were used to cover 1% of Nigerian's surface area, then 2.547 x 10 MWH of electricity can be produced from this source alone. It is also estimated that solar energy that could be converted to electrical energy in the process would be equivalent to 4.656 million barrels of crude oil per day. Solar energy has been the potential reducing the demand for wood fuel especially when it is put to a use very well i.e. crop drying, water heating and refrigeration of vaccines especially in the rural areas of Nigeria.

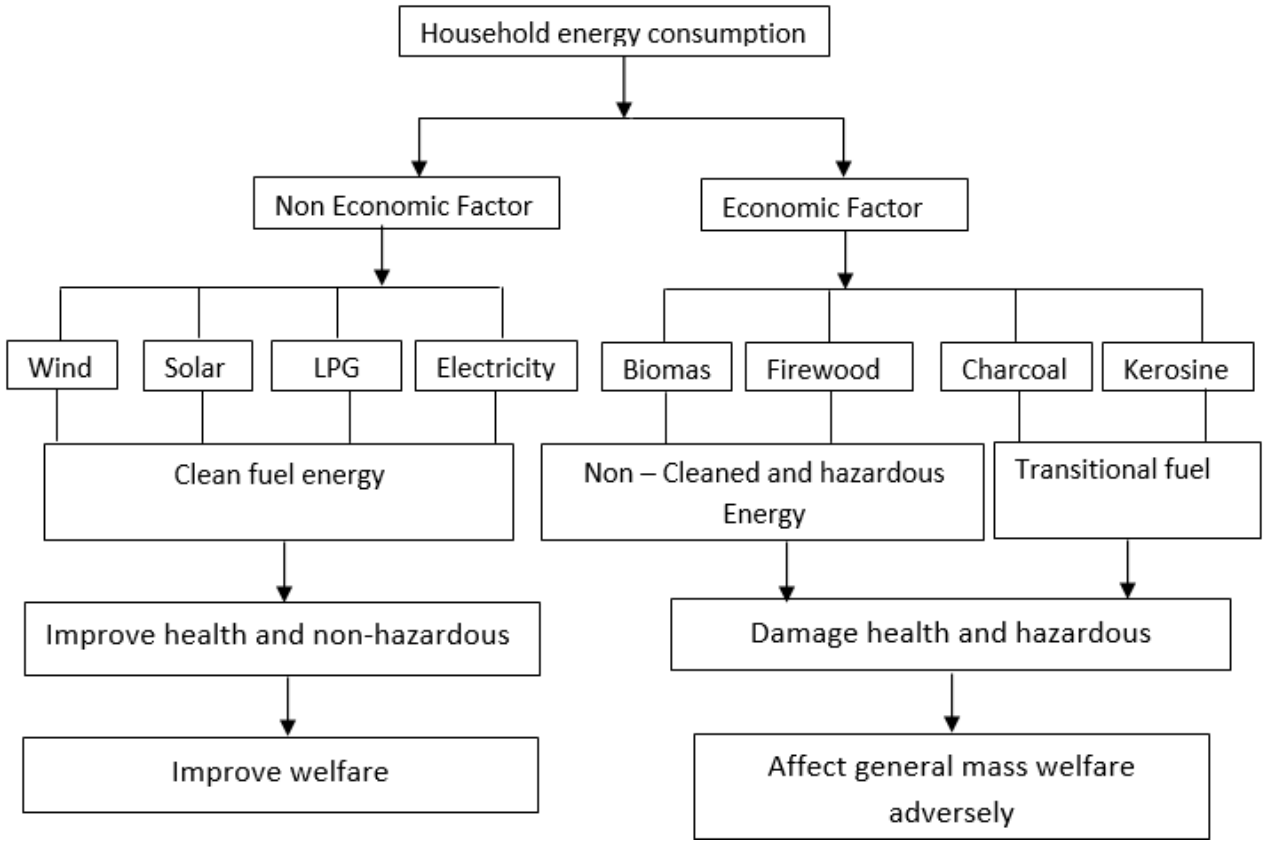
III) Wind Energy: this type of energy is produced as a result of the differential heating of the earth's surface by solar radiation. There is a general consensus that wind speed can be converted into wind energy for use in many parts of Nigeria (lJkpong, 1998 and Iwu, 1998). Although wind speed is weak in the south, it is stronger in the coastal areas and hilly regions in the northern parts of the country. Wind energy has variety of uses including water pumping and grain milling. According to Isola [10], based on the average wind speed in the country, it has been recognized that the potential for converting wind into energy is concentrated around six (6) locations namely; Enugu, Kano, Jos, Lagos, Port-Harcourt and Sokoto. However, the use to which these resources are put is largely determined by the industrial policies of the government.

IV) Biomass: this source of renewable energy is biologically derived from living materials or organism like waste, wood and alcohol fuels. The sources of biomass are specifically planned to generate electricity or produce heat from them. The most commonly used biomass is; dead trees, wood chips and tree trunks. It also includes plants and animals that are used for production of chemicals and fibers; it may also include waste that is biodegradable meaning waste that is usually burnt as a fuel. However, biomass energy does not include organic materials like fossil fuels. Biomass resources in Nigeria have been estimated to be about 816 M.J. The biomass plant can be utilized as a fuel for small-scale business and industries. Also it could be fermented by anaerobic bacteria to produce a versatile and cheap biogas i.e. fuel gas.

Methodology and data

Because this paper is a study of households at the micro level, this section contains the description of the methods used in data gathering as well as the model used by the study as the tool of data analysis.

Conceptual framework



Above, the households' energy consumption pattern and substitution models applied to various energy sources like biomass, firewood, kerosene, electricity and LPG. The chart constitutes the framework for household energy demand and its impact. The application of this model will help in understanding and analyzing how various factors influence households' energy choice and energy substitution. Also the outcome and the implication of this behavior may be improve health, incomes, and reduce pollution if the clean energy is chosen which in turn raise the well-being of the populace. However, when the decision of the households' energy consumption falls on non-cleaned energy, the result may be damage health and increased pollution which in turn negatively affect the general societal welfare.

Model specification

This paper will use multiple regression analysis comprising household energy consumption as a dependent variable and household income as well as energy prices as independent variables. The ideology of the energy ladder model is employed to view variations of household income as endogenous variable while energy prices based on this theory as an exogenous variable. The purpose is to estimate the impact of different income level amongst households and energy prices on household energy consumption. As stated by the energy ladder model, as households' income expands, they tend to switch to better and efficient energy sources and vice-versa.

The data set for this paper shall be time series and cross-sectional. The energy price is time series in nature spanning between years 2004 to 2019, while household income is cross-sectional spanning amongst different households.

Now, we postulate that;

Household energy consumption = f (Households' Average Income per Month, energy prices) - - - - (1)

We may wish to denote;

Y = Households' Energy Consumption (HEC)

X_1 = Households' Average income per Month (HAI)

X_2 = Energy Prices (EP)

The reduced version of our equation 1 becomes:

HEC = f (HAI, EP) - - - - (2)

It is to be noted that under such function as shown above, income of households and energy prices are taken as the major determining factors of household energy consumption.

However, our regression model shall be:

$HEC = \alpha_0 + \alpha_1 HAI + \alpha_2 EP + U$ - - - (3)

Where:

α_0, α_1 and α_2 are parameters

U = Error term encompassing non-included Regressors in the model

X_1, X2 = Explanatory/Regressors in the model

Y = Regress and

The apriority expectation is that α_o and α_1 should be positive and greater than zero. That is, α_o, $\alpha_1 > 0$.While, α_2 is negative and less than zero. The reason being that α_0 is autonomous energy consumption by households, α_1 is the coefficient of income which is expected to have a direct and positive relationship with household energy consumption while α_2 the coefficient of energy prices and it is expected to be negative showing inverse relationship between consumption and price.

Again due to complexity in the data, especially those on household consumption and household income the log-linear form of our model in equation 3 above will be taken as:

Log Y= α_0+ α_l - - - (4)
The reason for equation 4 is to allow for easy data manipulation and analysis.

Results and discussion

Regression result

The result of regression analysis presented below is computed by the researcher using E-view 6. Household's energy consumption is taken as the dependent variable, (Log. HEC) and it is regressed against the independent variables: households' average income and energy prices. (Log. H.A.I and E.P respectively) the summary of the regression results is presented in the table below:

Table 2: Results of Regression Analysis Using Log-Linear Analysis

Variables	Coefficients	Std. Error	T-statistics	Probability
Constant (α_o)	9.17S281	5.717441	1.605313	0.1471
Log HAL	0.941401	0.037430	25.15090*	0.000
Log EP	-2.690694	1.479141	-1.819093	0.1064
R^2	0.990	-	-	-
Adjusted R^2	0.988	-	-	-
F-Statistics	412.5528	-	-	0.00000
D-W Statistics	1.938689	-	-	-

Source: Researcher's Computation from E-view 6.
NB:
** Means parameters are within acceptable bounds i.e. R^2> 50%
Means t-test is significant at 0.10 S.L.

From the regression results above the constant (α_o) is autonomous household energy consumption. The result reveals that the constant is positive and greater than zero satisfying the apriority expectation and meaning that even if household income is zero and that if they are no prices of energy, households would still consume energy say, wood fuel and traditional biomass up to the tune of 9.178. The findings are however within the existing economic theories on consumption. That is, the finding satisfies the theories on consumption. However, the parameter (α_o) is significant only at 0.20 level of significant.
The coefficient of households' average income (log HAI) is 0.94 implying that with a unit increase in household income, there would be a switch to more efficient energy source by households. That is as household income increases, their energy consumption also increase. This is because they tend to use more efficient energy sources like gas cookers and electric cookers; they buy generators as alternative to electricity from PHCN and so on. This finding is also within the context of or agrees with the energy ladder model and other consumption theories in general. Specifically, the finding agrees with the marginal propensity to consumer which says that MPC should be between 0 and 1. Therefore, we can say this finding satisfies the apriority expectation on the size and sign of the parameter. This parameter is significant both 0.50 and 0.10 significant level.
Lastly, the coefficient of energy prices (log EP) is -2.69. This shows that a negative relationship exist between household energy consumption and energy prices. Unlike household income, if energy prices increase, this will tend to decrease household energy consumption specifically the expensive ones. Household would thus switch to less expensive ones. This finding also is in concordance with the energy ladder model energy price is taken as an exogenous variable. The parameter also satisfies the expected sign (negative and less than zero). This coefficient is also significant only at 0.20 significant levels.
D-W statistics is known as Durbin-Watson test for the presence or otherwise of autocorrelation in the model. The calculated d-statistic of 1.938 which is approximately 2 implies the absence of autocorrelation in the model using 5% significant level and K = 2, n = 11. Therefore, our regression model is free from auto correlation of the error terms.

Conclusion

This paper examined the determinants of energy demand and willingness to pay for improved energy sources in Mubi Metropolis, Adamawa – Nigeria. The general analysis of data has shown in the results the important factor of power in enhancing the hare of the people. The result also reveals that different income groups would access different sources of energy specifically that the higher income group would have access to more efficient and clean energy sources than the low income groups. The test of hypothesis also shows that households' energy consumption depends majorly- on household income and energy prices. The regression result shows that the relationship between household energy consumption and household income is positive while the relationship between household energy consumption and energy prices is negative.
It has shown that most of the households in Mubi Metropolis use firewood as cooking fuel and kerosene for lightning. Majority of the households' energy consumption in this area does not reflect or depend on their income and the energy prices. It is also finds out that even if household income is zero and that if there are no prices of energy, household would still consume energy. It is also finds out that the findings are within the existing economic theories of consumption, the higher income group demand clean and modern energy than the low income ones. The foregoing suggests that most people living in this area do not have adequate access to modern source of energy that is less environmentally harmful.
This paper also find out that despite the distributive and administrative bottleneck which make the supply of clean energy sources like; electricity and LPG in short supply, this paper find out that households are willing to pay for improved clean energy source which is non-hazardous and improve general welfare.

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