



Domestic Energy Preferences for Some Selected Urban Areas of Owerri, South-East, Nigeria

C.A. Madu*, A.C. Nwachukwu and C.E. Akujor

Department of Physics, Federal University of Technology, Owerri

(Submitted: March 15, 2016; Accepted: July 29, 2016)

Abstract

We have carried out a survey of domestic energy use in Owerri urban areas of Imo State, Nigeria. Using the random sampling method, we distributed questionnaires to residents and also did oral interviews. Percentage, pie chart and chi – square were used for the analysis of data and testing of hypothesis. Our findings show that only about 30% of the respondents are aware of the harmful effects of fossil fuels and therefore would prefer to use renewable energy resources. The remaining 70% are totally ignorant of the hazards to health and environment arising from the use of non-renewable energy. A majority of the respondents depend on petrol, gas, fuel-wood, kerosene *etc* for domestic lighting, cooking, powering of appliances and industrial purposes. We therefore suggest that research institutions, Government, NGOs should as a matter of urgency, create awareness of the benefits of renewable energy technologies and the dangers inherent in the continued use of fossil fuels.

Keywords: Renewable energy, non-renewable energy, energy security.

1.0 Introduction

Energy is central to the technological development of any nation. Energy is needed especially in the form of electricity for providing facilities such as light, communication, transportation etc. In essence adequate supply of energy is crucial to the sustainable development of nations. The main sources of electricity in Nigeria is gas and hydropower. This shows that fossil fuels play a major role in energy generation in the country. The energy supply in Nigeria has been found to be very unreliable and also constitute a great hazard to the environment. There is also the problem of inadequate technological capacities in the energy sector and inefficient energy utilization. After many years, the challenges persist, despite the enormous energy resource the country is endowed with. Nigeria has abundance of energy resources like solar energy, wind power, hydropower, tidal and geothermal which are clean, sustainable, inexhaustible, environment friendly and reliable (Sam-Amobi *et al*, 2014).

These renewable energy sources have become the focus of current energy deployment and use globally. Indeed the International Energy Agency (WEO 2011) projection shows that solar power generators

may produce most of the world electricity within 50 years, reducing the emission of greenhouse gases that harm the environment (Sill, 2011). Therefore, photovoltaic and concentrated solar power together can become the major source of electricity (Jacobson 2011).

Nigeria with its large population and abundant carbon energy resource is a major player in the world energy milieu. Thus, she has an obligation to contribute to the global effort to reduce carbon footprint. Moreover, it serves its national interest to improve efficient utilization of energy and provide reliable clean alternative for its citizens.

In order to develop an effective plan for energy production and use one needs a good knowledge of the current state of the deployment of the renewables for domestic applications, its environmental effects among other factors need also to be considered. Indeed it is very crucial to know the factors that determine some energy preferences, for example, what roles do cultural background, level of education, economic status play in choosing the source of energy for domestic consumption. This study is therefore intended to understand the pattern of domestic energy use in Owerri Urban areas.

2.0 Methodology

We carried out the survey in Owerri, the capital of Imo State in the South East geopolitical zone of Nigeria. It consists of three Local Government Areas namely: Owerri Municipal, Owerri North and Owerri West. As at 2006 census, Owerri had an estimated population of 401,873 (Gazette, 2007). The locations of the 3 LGAs are shown in the map of Imo State in Figure 1.



Figure 1: Map of Imo State showing the 27 local government areas including the 3 study areas (<http://www.nigerianmuse.com>, 2010)

Questionnaires were distributed to identify the various sources of energy used by the residents for cooking, lighting, powering of appliances and transportation. 500 questionnaires were distributed and 498 (99%) were returned fully completed. The questionnaires were administered randomly to the residents irrespective of educational and professional background.

Data were collected to determine the respondents' awareness of the environmental implication of fossil fuel use, health risks and exhaustible nature of non-renewable energy, choice of energy use and the level of awareness of the availability of renewable energy as an alternative source of energy. In the course of the survey, random sampling method was used to select the houses surveyed. Four research questions were postulated:

- ◆ Does the use of non-renewable energy release dangerous emissions and harmful chemical pollutions into the environment?

- ◆ Is non-renewable energy exhaustible?
- ◆ Does the use of renewable energy produce any waste products which may be harmful to man and other living things?
- ◆ Is renewable energy obtained from resources which are naturally replenished on a human time scale?

3.0 Results and Discussion

3.1 Sources of Energy for domestic use

The result of the study as shown in the pie-chart, Figure 2, indicates that 28% of the energy needs of the respondents were met by the national grid. 7% use solar for their electricity generation, while 56% use power generating sets for their household electric energy needs. About 9% use fuelwood for their cooking. The respondents that use generating plants said that it negatively affects their general productivity because of erratic nature of supply and affects their finance due to high cost of maintenance. However, 70% of the people that use generating sets are not aware of the harmful effects of fossil fuels. These fuels have contributed significantly to the problem of environmental pollution. When hydrocarbon is burnt, it produces carbon dioxide which is a greenhouse gas and a major contributor to global warming and climate change. The data further show

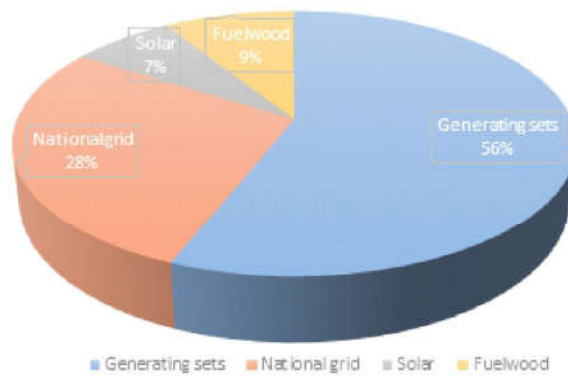


Figure 2: Total Energy use

that there is at least one power generating plant in every compound surveyed. Sam-Amobi *et al.* (2014) in a similar survey carried out in Enugu urban areas also in the South East of Nigeria found that over 90% of the respondents were not aware of the environmental implications of using power generating sets. There is therefore need to mount intensive awareness campaign to enlighten and educate the

citizenry on the dangers of both noise and air pollution on health and environment.

Table 1 shows the pattern of domestic energy use by respondents. We can from it see the respondents' energy preferences for domestic lighting, cooking and powering of appliances.

Table 1: The pattern of domestic energy use

Energy Source	Lighting (%)	Cooking (%)	Powering of appliances (%)
Gas	10	52	15
Kerosene	-	36	-
Fuelwood	-	9	-
Petrol	50	-	63
Solar	10	3	11
Diesel	16	-	4
Wind	1	-	1
PHCN	13	-	6

Figure 3 shows that for lighting purposes, electric generators are mainly the source of energy for the group interviewed. About 50% use premium motor spirit (petrol) in their generators, 16% use diesel while 10% use gas and solar energy respectively. Due to the erratic supply of power by the Power Holding Company of Nigeria (PHCN) in charge of power from the national grid, only a paltry 13% of the respondents get their light from that source.

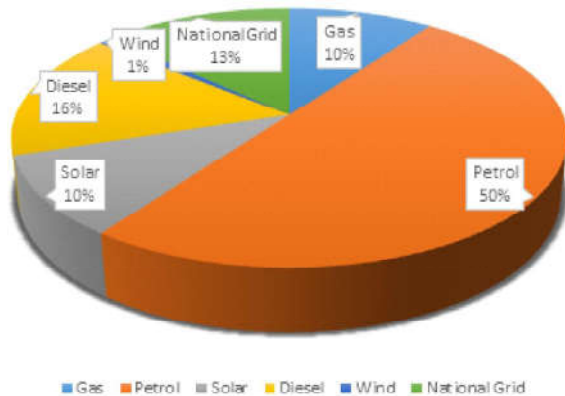


Figure 3: Energy source for domestic lighting

Figure 4 shows the respondents' sources of energy for cooking in Owerri Urban. We found that petroleum products such as gas and kerosene contribute a large percentage of the energy for domestic cooking of the households surveyed. 52%

use gas while 36% use kerosene, only 9% use fuelwood for cooking. The small number using fuelwood can be attributed to deforestation in urban areas while the preference of gas and kerosene is mainly due to availability and cost considerations. The only renewable resource in use for domestic cooking is solar energy, but in a very small scale, about 3%.

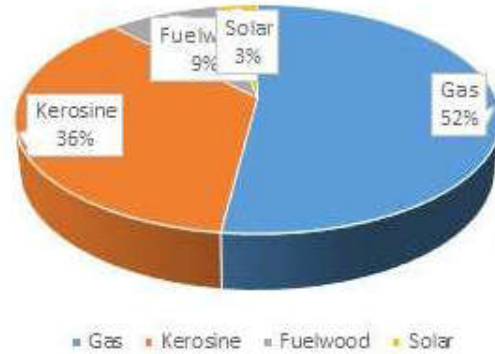


Figure 4: Energy sources for cooking

The results from the survey show that about 90% energy needs of the respondents are met through the use of petrol, diesel, gas and fuelwood. All these are non-renewable energy resources which are finite and will definitely run out one day. Furthermore, the hazardous emissions from these sources are of great concern to scientists and environmentalists. The use of non-renewable gives off greenhouse gases which are responsible for climate change. Even though 30% of the respondents said they are aware of these harmful effects of non-renewable energy sources but they are compelled to use them because they are the most available. Also the initial cost of installation of renewable energy technology makes it unattractive in the short run. However, the benefits of renewables abound. Apart from providing clean and green energy, they lead to a reduction in fuel import thereby increasing energy security. The sun and the wind are abundantly available in Nigeria.

4.0 Conclusion

In this work we have carried out a survey of the pattern of energy use in Owerri Urban areas. We also investigated the level of awareness of the respondents on the dangers of using non-renewable energy resources for household chores such as lighting, cooking and powering of appliances. We

administered questionnaires on randomly selected residents. Our results show that about 50% of the respondents use petrol in their electric generating set for lighting. We also found that petroleum products such as gas, kerosene contribute a large percentage of the energy for domestic cooking of the households surveyed. 52% use gas while 36% use kerosene and 9% use fuelwood.

Therefore considering the growing concerns about the sustainability of the use of fossil fuels and the adverse environmental and socio-economic consequences of their production and use we strongly recommend that the Nigerian government and non-governmental organizations operating in the country mount intensive enlightenment campaigns to educate the citizenry on the hazards of continued use of fossil fuels and also on the benefits of using renewable energy resources such as solar energy for domestic purposes. It will also be necessary for governments and multi-national co-operations to have credible energy policy frameworks in place and to invest in the production and distribution of renewable energy especially solar so as to reduce cost and make it freely and easily available. Initial cost of installing solar devices can be subsidized and also the net metering technology can be adopted. Funding is also advocated to promote research in renewable energy technology to make it more efficient and invariably cheaper. In this way the nation would have contributed substantially to the global effort aimed at reducing carbon footprint. Renew-

able energy is the only viable option available to man for providing solution to the energy crises and environmental sustainability.

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