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AWARENESS LEVEL OF GREEN ENERGY BIOFUELS TOWARDS THE UTILIZATION OF MOST SUSTAINABLE APPROACHES TO ENERGY SUPPLY IN NIGERIA

Adedayo Julius Olugbenga (Ph.D)
Department of Science Education, Faculty of Education,
Ekiti State University, Ado-Ekiti
(+2347032781996; olugbenga.adedayo@eksu.edu.ng)

ABSTRACT

Biofuel is a renewable energy source that is produced from plants and can offer better environmental benefits compared to fossil fuels, hence has the tendency to replace gasoline, diesel fuel and coal, which are fossil fuels. The study adopted a descriptive design of the survey type whose targeted participants were energy producers, industrialists and domestic energy consumers in Nigeria. The research instrument was a questionnaire which was administered online through a Goggle form designed to reach reasonable members of the targeted participants. Their responses were subjected to descriptive and inferential statistics of frequency counts, percentages and t-test at 0.05 level of significance. The result of finding revealed that many people in Nigeria are aware of green energy biofuels, mostly through readings but only a handful of them ever saw it physically. It was also observed that green energy biofuels are not readily available in Nigeria. Hence, very few have used ethanol for cooking at one point or the other. Based on these results, it was recommended, among others, that NNPC should embark on large production of green energy biofuels for reach of Nigerians while upcoming investors are encouraged to venture into the production of green energy biofuels in Nigeria.

Keywords: Awareness, biofuels, biomass, energy supply, green energy, renewable energy.

INTRODUCTION

The issue of energy availability for daily activities is a germane one both to the developed and developing countries. The prevailing era of technology has aggravated the desire for energy to power the domestic and industrial devices and equipment at disposal, otherwise, live would not worth living and leaves the gadgets as waste of economy. Fossil fuels have been the common energy sources over the decades which were generated from the decomposition of plants and animals. These were made available for use as coal and petroleum (gasoline and diesel). Thus, fossil fuels are carbon-based energy sources like coal, oil and natural gas.

The challenges pose by fossil fuels seem insurmountable over time despite frantic efforts by the government and individuals to maintain uninterrupted energy supply in Nigeria. The problem ranges from irregular supply to low voltage supply, global warming due to carbon monoxide emission and high costing. Power outages are frequent in the cities and 49% of the population has no access to electricity at all (Mofoluwake, Tomas, Sikiru, & Mohammad, 2013). If citizens would benefit maximally from the modern technology, which depends mainly on electricity to operate, then thinking of an alternative source of energy would be a desirable venture.

Biofuels have been in existence since the invention of cars. But, when a huge petroleum deposits were discovered, the gasoline and diesel became very cheap. Consequently, biofuels were

forgotten (Biofuel.org, 2018). However, the recent challenges of fossil fuels are a pointer to the need to consider the biofuels for energy source. Hence, biofuels are regaining popularity globally.

CONCEPT OF BIOFUELS

Biofuel refers to any fuel that is obtained from biomass – that is, plant or algae material or animal wastes (Clarence & Noelle, 2018). These materials are easily renewed, by implication; biofuel is a kind of renewable energy. Biofuels could be obtained from renewable biological substances like wood, sawdust, leaves, and even dried animal dung. The use of ethanol as a fuel was first invented by a German named Nikolaus August Otto. Later, Rudolf Diesel invented the diesel engine. In early 20th century, Henry Ford fueled his Model Ts car with ethanol, and early diesel engines were shown to run on peanut oil (Biofuel.org, 2018).

Gasoline and diesel are early biofuels, which were made from decomposed plants and animals that have been buried in the ground for many years, hence, they were called fossil fuels. Green energy biofuels are also source of fuel similar to fossil fuels, except that they are produced from green and fresh plants. Unlike other renewable energy sources such as Geothermal energy, Wind power, Solar energy, etc, biomass can be converted directly into biofuels, a liquid form which can be used for transportation purposes in cars, trucks, buses, airplanes, and trains. The two most common types of biofuels are ethanol and biodiesel. In the United States, ethanol is often got from corn while in Brazil, it is got from sugarcane. Biodiesel is made from vegetable oils and liquid animal fats. Ethanol fuel is the most common biofuel worldwide. Alcohol fuels are produced by fermentation of sugars derived from wheat, corn, sugar beets, sugar cane, molasses and any sugar or starch from which alcoholic beverages such as whiskey, can be made like potato and fruit waste, etc. (Wikipedia, 2018). Other examples of biofuels are green diesel, which is derived from algae and other plant sources; and biogas which is methane and is produced from animal manure and other digested organic material.

Biofuels have been used in many countries in various ways. For example, ethanol obtained from sugarcane is being used in Brazil to run some cars instead of fossil fuels and biodiesel extracted from palm oil is used by Europeans as fuels. In early 2011, the U.S. government approved ethanol blends of up to 15% for use in vehicle models newer than 2001, and blends of 10% have been used for years now with no need for engine modification (Staff, 2011).

Biofuels production is not without its attended negative effects, especially on land, water and biodiversity. However, the production of biofuels has more positive effects over its negative effects, especially in reducing greenhouse gas emissions and thereby alleviating the global warming effects often produced by fossil fuels (Food and Agriculture Organisation of the UN, 2008). Moreover, biofuels are renewable energy sources from the so-called "energy crops" like wheat, corn, soyabeans and sugarcane unlike fossil fuels which are carbon-based energy sources like coal, oil and natural gas (John, 2019). Another advantage of biofuels over fossil fuels is that biofuels burn cleaner than fossil fuels, and consequently release fewer pollutants and greenhouse gases (such as carbon dioxide) into the atmosphere. Use of biofuels can reduce carbon emissions by 85% compared to mineral diesel (Biofuels Association of Australia, 2016). Biofuels are as well sustainable, and energy companies often mix biofuels with gasoline. Moreover, the prices for biofuels is falling gradually and tending towards being significantly

less expensive than gasoline and other fossil fuels. Report has it that ethanol is already cheaper than diesel and gasoline (Jared, 2019). More interestingly, biofuels can be produced locally, which decreases the nation's dependence upon foreign energy.

As at present, Nigeria as a country relies on imported gasoline for vehicles. A high percentage of her transportation fuels come from petroleum, unlike other energy sectors which can rely on several sources of energy. Biofuels are promising alternative for liquid fuels that often come from petroleum. Upcoming green energy biofuels companies in Nigeria include Global Biofuels Limited with headquarters in China, which converts the juice from the stalk of sweet sorghum (sorghum bicolor moench) to ethanol (Global Biofuel Ltd, 2010). This company is in partnership with Oceanic Bank (Nig), governments of Ondo, Ekiti and Osun states. The company is working with the state governments to establish fuel refineries in various parts of Nigeria. Of recent, the Nigerian National Petroleum Corporation (NNPC) signed two Memorandum of Understanding (MoU) with Nigerian-Chinese consortia to build not less than ten large biofuels complexes across Nigeria, aimed at developing sustainable biofuels in the country (NNPC, 2018).

STATEMENT OF THE PROBLEM

The energy supply in Nigeria for the past few decades has been thought provoking in lieu of its irregular supply and inadequacy in quality, even when available. The erratic supply of energy to Nigerian citizens has over the years been a major issue of debate at every level of popular discussion. Despite the attempt of the government to make adequate supply of energy to her citizenry, there has not been any noticeable improvement on the sector.

The need of energy for daily activities capable of engendering a sustainable worthwhile living (commercially and domestically) by Nigerian citizens is high to the extent that it can be asserted that virtually nothing can be achieved without energy availability.

From the discourse, the use of an alternative energy supply that can easily be produced through renewable source of would-be waste products is a giant strive to solving long prevailing problem of energy supply in Nigeria. Much as biofuels have the potency of solving the perennial problem of energy source, its utilization in Nigeria has not been popularly obvious.

The reason might be due to unawareness of this alternative energy source, either by the production community of the economy or the consumers. This paper therefore investigated the level of awareness of green energy biofuels in Nigeria which is capable of providing a sustainable energy through renewable sources.

RESEARCH QUESTIONS

The following questions were raised to guide the study:

1. Is there any awareness of green energy biofuels by Nigerians?
2. Are green energy biofuels available for use in Nigeria?
3. To what extent are green energy biofuels being utilized by Nigerian?
4. Are there green energy biofuels generating plants in Nigeria?

RESEARCH HYPOTHESES

The hypotheses formulated for the study are:

1. There is no significant difference in the awareness level of green energy biofuels between industrialists and domestic energy consumers in Nigeria
2. There is no significant difference in the utilization level of green energy biofuels between industrialists and domestic energy consumers in Nigeria

METHODOLOGY

The study adopted a descriptive design of the survey type. The targeted participants were energy producers, industrialists and domestic energy consumers. A questionnaire tagged "Green Energy Biofuels Awareness in Nigeria" (GEBAN) was used to gather data for the study. The instrument has two sections A and B. Section A requested for bio-data of the respondents while section B contained 15 Items on the premise of the contents of the study. The validity of the instrument was ascertained for face and content validity by experts in Test and Measurement from Ekiti State University, Ado Ekiti. The reliability of the instrument was assured through pilot administration on 50 industrialists and domestic energy consumers in Ekiti state. Their responses were subjected to Half-split correlation analysis which yielded a reliability coefficient of 0.79 at 0.05 significance level.

To reach reasonable members of the targeted participants of the study, a special web page was designed mainly for the study. Through this, participants across the globe were able to attend to the items of the questionnaire. Their responses were subjected to descriptive and inferential statistics of frequency counts, percentages and t-test, tested at 0.05 level of significance.

RESULTS

Descriptive Analysis

Research Question 1: Is there any awareness of green energy biofuels by Nigerians?

Table 1: Frequency counts and frequency of awareness of green energy biofuels by Nigerians

S/N	ITEMS	YES		NO	
		N	%	N	%
1.	Have you ever heard of green energy biofuels before?	84	77.8	24	22.2
2.	If yes, through what means? a. online	9	10.7		
	b. Verbally	34	40.5		
	c. Reading	41	48.8		
3.	Have you seen any green energy biofuel before?	20	18.2	88	63.6
4.	If yes, through what mediums? a. Online	0	0.0		
	b. Physically	7	38.9		
	c. On Book	11	61.1		
5.	Which type of green energy biofuels have you heard of or seen before? a. ethanol	5	27.8		
	b. biodiesel	0	0.0		
	c. biogas	13	72.2		

It is evident from table 1 above that 84(77.8%) of the respondents have heard of green energy biofuels before while only 24(22.2%) have not; 9(10.7%) have heard of green energy biofuels through online, 34(40.5%) verbally and 41(48.8%) through reading of book. Also, only 18(16.7%) of the respondents have seen any green energy biofuel before while 90(83.3%) have not; none has seen it online while 7(38.9%) have seen it physically and 11(61.1%) have seen it on book; 5(27.8%) of the respondents had seen ethanol biofuels before, none has seen biodiesel before while 13(72.2%) had seen biogas before. It therefore implies that the awareness of green energy biofuels by Nigerians is very low.

Research Question 2: Are green energy biofuels available for use in Nigeria?

Table 1: Frequency counts and frequency of availability of green energy biofuels in Nigeria

S/N	ITEMS	YES		NO	
		N	%	N	%
1.	Are green energy biofuels available for purchase in your area?	18	16.7	90	83..3
2.	If yes, where can green energy biofuels be purchased in your area? a. Company	0	0.0		
	b. retailer	108	100.0		
3.	Is any green energy biofuel readily and easily come by in your area?	29	27.3	79	72.7
4.	If yes, which of them? a. ethanol	54	50.0		
	b. biodiesel	0	0.0		
	c. biogas	54	50.0		

Table 2 above reveals that 20(18.2%) responded that green energy biofuels are available for purchase in their area while 88(63.6%) could not; the available green energy biofuels are only purchased from the retailers 108(100.0%) only. 29(27.3%) can readily and easily come by green energy biofuels in their area while 79(72.7%) could not; and only ethanol and biogas are available by 54(50.0%) respectively. Therefore, green energy biofuels is not available for use in Nigeria.

Research Question 3: To what extent are green energy biofuels being utilized by Nigerian?

Table 1: Frequency counts and frequency of extent of utilization of green energy biofuels in Nigeria

S/N	ITEMS	YES		NO	
		N	%	N	%
1.	Have you ever used any green energy biofuels before?	10	9.3	98	90.7
2.	If yes, which of them? a. ethanol	34	31.5		
	b. biodiesel	0	0.0		
	c. biogas	74	68.5		
3.	How often do you use green energy biofuels? a. regularly	0	0.0		
	b. occasionally	11	10.2		
	c. rarely	11	10.2		
	d. never	86	79.6		
4.	For what purpose(s) have you used or are you using green energy biofuels? a. Cooking	108	100.0		
	b. transportation	0	0.0		
	c. industrial	0	0.0		

It is evident from table 3 above that only 10(9.3%) have ever used any green energy biofuels before while 98(90.7%) have not; 34(31.5%) have used ethanol before, none has used biodiesel before while 74(68.5%) have used biogas before; none 0(0.0%) uses green energy biofuels regularly, 11(10.2%) use green energy biofuels occasionally/rarely while 86(79.6%) never use green energy biofuels. Green energy has only been used for cooking 108(100.0%) while none 0(0.0%) has used it either for transportation or industrial purpose. It can therefore be inferred that
the extent to which green energy biofuels are being utilized by Nigerians in very low (9.3%).

Research Question 4: Are there green energy biofuels generating plants in Nigeria?
Table 1: Frequency counts and frequency of awareness of green energy biofuels generating plant in Nigeria

S/N	ITEMS	YES		NO	
		N	%	N	%
1.	Are you aware of any green energy biofuels generating plant/company in Nigeria?	27	25.0	81	75.0
2.	If yes, name them i. FUNAAB, ABEOKUTA	7	26.0		
	ii. NNPC	15	55.5		
	iii. UNDER CONSTRUCTION, ONDO STATE	5	18.5		

From table 4, it is showed that 27(25.0%) of the respondents are aware of any green energy biofuels generating plant/company in Nigeria while 81(75.0%) are not. Out of those that are aware, 7(26.0%) knew of FUNAAB, Abeokuta; 15(55.5%) knew of NNPC and 5(18.5%) knew of the one under contruction in Ondo State. Thus, there are few green energy biofuels generating plant/company in Nigeria.

TESTING HYPOTHESES

Ho_1: There is no significant difference in the awareness level of green energy biofuels between industrialists and domestic energy consumers in Nigeria

Table 5: t-test analysis of awareness of green energy biofuels between industrialists and domestic energy consumers in Nigeria

Variable	N	$\bar{X}$	SD	Df	t-cal	p-value
Industrialists	47	2.234	1.723	106	1.271	0.081
Domestic Consumers	61	3.451	1.295			

P > 0.05

Table 5 shows that t-cal = 1.271, p (0.081) > 0.05. Hence, the null hypothesis is not rejected. This means that there is no significant difference in the awareness level of green energy biofuels between industrialists and domestic energy consumers in Nigeria.

Ho_2: There is no significant difference in the utilization level of green energy biofuels between industrialists and domestic energy consumers in Nigeria

Table 6: t-test analysis of utilization of green energy biofuels between industrialists and domestic energy consumers in Nigeria

Variable	N	$\bar{X}$	SD	Df	t-cal	p-value
Industrialists	47	4.713	1.425	106	0.454	0.152
Domestic Consumers	61	4.591	1.172			

P > 0.05

It is evident from table 6 that that t-cal = 0.454, p (0.152) > 0.05. Therefore, the null hypothesis is not rejected. It therefore means that there is no significant difference in the utilization level of green energy biofuels between industrialists and domestic energy consumers in Nigeria

CONCLUSION

Based on the findings of this study, it can be concluded that:

- there is low awareness of green energy biofuels in Nigeria
- green energy biofuels is not available for use in Nigeria
- utilization of green energy biofuels in Nigeria in very low
- green energy biofuels generating plant/company in Nigeria is just coming up
- there is no significant difference in the awareness level and utilization of green energy biofuels between industrialists and domestic energy consumers in Nigeria.

RECOMMENDATIONS

The following are recommended from the conclusion of this study:

- ❖ Nigerian should be sensitize as to the existence of green energy biofuels and be educated of the benefit they have over the present gasoline being used.
- ❖ Government should embrace the possibility of green energy biofuels and embark on establishing plants for their production in Nigeria.

APPLICATION/IMPLICATION

The upcoming of green energy biofuels in Nigeria would be a welcome development. It would solve the problems often posed by inconsistence and erratic supply of energy in Nigeria. This invariably would improve the economic status of the country as well as enhance social life of the citizenry.

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