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OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

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CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

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- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University, Kurukshetra.

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- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

ECONOMIC COST IMPLICATIONS OF THE USE OF GENERATORS AS ALTERNATIVE SOURCE OF ENERGY IN KANO METROPOLIS - NIGERIA

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ABSTRACT

The paper examines the economic cost implications of the use of generators as alternative source of energy in Kano metropolis – Nigeria. Specifically, it focuses on what happens to income, employment, health and the environment in Kano metropolis as generators are being used as substitutes to energy supplied by government. Exactly sixty-two and a half (62.5%), that is five (5) of the eight local governments in the Kano metropolis were selected purposively. They are Dala, Fagge, Gwale, Nassarawa and Tarauni local government areas. From the 5 sampled local governments, 15 respondents each were chosen, making a total of 75 respondents. Complementing the questionnaire source of data, 5 professionals were interviewed (1 environmental expert, 2 businessmen and 2 health specialists) and observations conducted. The major findings show that use of generators has reduces consumers' effective demand in Kano metropolis, and its excessive use is responsible for the double digit inflation in the country at large. The practice in the study area was found to be detrimental both to the environment and health of people living there. The paper recommends among others that the general public and particularly the users of generators should be sensitized on their implications on health so that preventive efforts would be taken thereby reducing particularly, its adverse consequences. Also, government should put more concerted efforts in generating and distributing electricity which could go a long way in providing opportunities for the less privileged in the country.

KEYWORDS
Cost Implications, Energy, Social Cost, Kano metropolis.

INTRODUCTION

Available statistics shows that about 60 percent of Nigerian population lack access to electricity for their needs (Baker, 2008). Despite abundant amount of both renewable and non-renewable energy sources in Nigeria, excessive substitution of epileptic power supply from National Electric Power Authority, PHCN (now Power Holding Company of Nigeria, PHCN) with highly polluting self generated power become the order of the day in the country. Nowadays, millions of Nigerian households and business enterprises are resorting to the use of generators to meet up their energy requirements.

The shocks from the electricity crises in Nigeria have created some wedges in the national wheel of effective management of industrial and other socio-economic programmes. The 150 million people of Nigeria are depending on less than 3000mw of electricity, with recurrent multiple and unpredictable power outages.

In view of the foregoing energy status in Nigeria, the country has been described as a "diesel generator economy" where small and medium scale enterprises incur extremely high overhead costs in maintaining them (Obadote, 2009). It has become a common knowledge that Nigeria has one of the highest concentrations of generators globally despite its rich energy resource. The negative impacts of these ubiquitous generators are enormous on environmental quality, people's health and on the economy as a whole. Consequently, this has elicited major concerns particularly among environmentalists, economists, health scientists and among other academicians.

Against this background this paper examines the economic cost implications of the use of generators as alternative source of energy in Kano metropolis-Nigeria. The article is to analyze the economic cost implications of using generators as sources of energy in Nigeria. Economic cost implication is a kind of analysis that explores the impact of, for example, the use of generators not only on the direct expenses and sufferings incurred, but rather, on its impacts on individuals, and the economy at large, now and in the future. By that it looks at what happens to income, employment, health and the environment as generators are being used as substitutes to energy supplied by government.

Understanding the economic cost implications of the use of generators as alternative source of energy in Kano metropolis would go a long way in informing the policy makers concerned on the right measures to device in addressing the unforeseen consequences and on how to improve where there are achievements. The outcome this paper would either support or otherwise the existing findings given its case specific nature.

LITERATURE REVIEW

SOURCES OF ENERGY IN NIGERIA

Nigeria is a rich-resource country endowed with an enormous amount of both renewable and non-renewable primary energy resources. According to the British Petroleum Statistical Review of World Energy, Nigerian crude oil and natural gas was estimated at 36billlon barrels and 185 trillion cubic feet, respectively (Table 1.1), are more than adequate to fuel much of Sub-Saharan Africa (SSA) energy demand for several decades. In addition to these non-renewable energy sources, there are also large amount of renewable energy sources like hydropower, solar radiation, wind energy and biomass as well as wave and tidal energy, which are abundantly available in the country.

TABLE 1: ENERGY RESOURCES IN NIGERIA

Energy types	Resource Estimates
Crude oil	36 billion barrels
Natural gas	185 trillion metric tons
Coal	2.75billion metric tons
Hydropower	14.750 mw
Solar radiation	35-37.0 KWh/m2day
Wind energy	2.0-4.0 M/S
Biomass	144 Million tons/year
Wave & Tidal energy	150,000 TJ/(16.6 x 106 toe/year)

Source: Ibitoye and Adenikinju (2007).

Nigeria has three major sources of non-renewable energy, namely oil, natural gas and coal. Available statistical data ranked Nigeria as the 6th largest oil producer in the world with a whopping 36 billion barrels of proven oil reserves at the beginning of 2007 (EIA, 2007). In addition to the oil wealth, the country has an estimated 182 trillion cubic feet of proven natural gas reserves, the seventh largest reserves in the world (EIA, 2007). The proven coal reserve so far in Nigeria according to experts is about 650 million metric tons while the inferred reserve sums up to 2.75 billion metric tons. This is exactly confirmed by the administrator of the Nigerian Electricity Regulation Commission (NERC), Talba Imamudden at a workshop in Abuja. Imamudden (2011) maintained that "given persistent challenges with the availability of gas in the country, coal could emerge as the next best viable option for Nigeria as our coal reserves are large with 650 million tones proven".

The country is also endowed with plentiful amount of renewable energy resources including large and small hydroelectric power resources, solar energy, biomass, wind, and development of geothermal and ocean energy (ECN, 2005). The hydropower potentials of Nigeria are very high and they currently accounts for about 29% of the total electrical power supply in the country (CBN, 2009). The total technically exploitable hydropower resource in Nigeria is in excess of 11,000 MW (Sambo, 2005). Several studies on solar energy resources in Nigeria (Sambo, 1986, Doyle and Sambo, 1988 and Folayan, 1988) have fully acknowledged its viability for practical use. It has been confirmed that Nigeria receives 5.08 x 1012KWh of energy per day from solar energy (Adenikiju et-al, 2007). This amount of electrical energy is equivalent to 4.66 million barrels of oil per day. Biomass energy refers to those biological energy systems such as wood biomass, forage, grasses and shrubs, residues and animal dung, estimated in the country at 144 million tons/year (Adenikiju, 2007). These are only some of the few energy potentials in Nigeria.

COST IMPLICATIONS OF USING GENERATORS IN NIGERIA

A London based magazine, African Review of Business Technology, in its April, 2006 edition revealed that Nigeria topped the list of generator importing countries for the fourth year in a row, having surpassed other importing countries since 2002. According to the report, Nigeria accounted for 35% or spent $152 million of the total $432.2 million spent by African countries on generator imports in 2005. In another similar report which focused on diesel generator of between 2000KVA and 5000KVA capacity, the report showed that Nigeria imported three times as many generators as the closet African importer- Sudan and Egypt that spent $40.6 million and $ 32 million, respectively on the product in 2005 (Aster, 2006). In the face of worsening epileptic power situation in the country, almost all urban homes and business centers have become a micro independent power producer. This state of affairs has a lot of serious economic, environmental and health implications on individuals, government, businesses and the economy as a whole.

ECONOMIC IMPLICATIONS

According to the Manufacturing Association of Nigeria (MAN) in 2005, only 10% of industries operated in the country of which only 10% of them could on the average function at 48.8 percent of their respective installed capacities. The survey also revealed that 60% of the companies were in comatose while another 30% had completely closed down. In another survey in 2006 also conducted by MAN, indicated that in the first quarter of 2006, most of the industrial areas around the country suffered on average of 14.5 hours of power outages per day, and the cost of generating power supply using generators accounts for 36% of total costs of production. Also, about 1500 firms (60% of the association's 2500 members) are in dire strict principally because of the additional cost of alternative power generation.

Currently, a number of multinational companies operating in the country, generate their own power through Independent Power Project (Udeajah, 2006). Similarly according to a MAN's statistics, nine companies within its fold spent a total sum of N69.5 billion to generate their power using generators (Odiaka, 2006). However, even with this situation, some of these companies have continued to make exorbitant profits and at the same time meeting their shareholders' needs. Clearly, such surprising performance is a reflection of the fact that more and more production costs are shifted to the final consumers whose disposable incomes continue to become powerless against the spiraling inflation, caused mainly by high cost of production due to excessive use of generators. Obviously, this has the tendency to reduce consumers' effective demand and force some companies to close down or even relocate to a more investment friendly environment in the long run.

In the same vein, excessive use of generators can also lead to reduction in gross domestic product (GDP). This will happen when some firms are forced to close down or to relocate to the neighboring countries because of high cost of operating personal generators to supplement the poor erratic power supply from the PHCN. As a result of poor power supply and other related factors, industrial sector contribution to the GDP in Nigeria, has continued to drop since 1990 from 8.2% to 4.7% in 2003, and further dropped to 4.06% in 2004 and rose slightly in 2005- the least figure since the country got independence in 1960 (Ajanaku, 2007).

ENVIRONMENTAL IMPLICATIONS

Another cost implications of using generators as sources of energy, apart from the economic implications is that of environmental pollutions. At every turn in any urban neighborhood of Nigeria, it is the continue buzzing noise of generators belching dangerous fumes into the air day and night tearing apart the serenity of the natural environment. Using generator sets to generate electricity can cause air, noise and other environmental pollutions. Air pollution is by far the most harmful form of pollution in our environment. Using generators as sources of energy emits sulfur dioxides into the atmosphere making our earth less habitable. As more sulfur dioxides and other greenhouse gasses concentrate and grow, more heat is trapped in the atmosphere and less escapes back into the space and consequently increase the temperature of the earth. This is what is called global warming. Global warming lead to alteration of weather patterns which in turn hasten species extinction, influence the length of seasons and cause coastal flooding, and eventually lead to frequent and severe storms (climate change). Soil, water and noise pollution too can also cause a lot of damages to our environment just like that of air pollution mentioned earlier. Use of generators produces unwanted noise and also releases heavy contaminants into the water and soil which contribute to the environmental degradation.

HEALTH IMPLICATIONS

There are also health implications associated with using generators to generate electricity. Use of generators causes serious health problems on individuals and the society as a whole. For instance air pollution causes some serious health problems depending on the dose or concentration of exposure to the fumes emitted by the generators. Some of these health problems include toxic poisoning, birth defects, eye irritation, cancer and irritation of repository systems, increase chronic diseases such as asthma (Botkin and Keller, 2003). Another health implication of using generators is that of noise pollution which is said to have resulted in hearing losses for some many Nigerians. It is scientifically proved that prolonged exposure to intense noise such as one produce by generators can lead to permanent hearing loss, induce stress, cause inefficiency at work, prevent sleeping, cause irritability and generally degrades the quality of life. The sum consequences of these health implications are responsible for general fall in productivity of labor force in the country and in some cases affecting the general standard of education of both the adults and the children at all level of education.

MATERIAL AND METHODS

POPULATION OF THE STUDY

The population of this study covers the entire population of Kano metropolis. However, the target population of the study constitutes of households and businessmen (owners, managers, employers, industrialists and entrepreneurs) in all the Metropolitan local governments of Kano state. The metropolitan area covers 8 local governments which are: Dala, Fagge, Gwale, Kumbotso, Munincipal, Nassarawa, Tarauni and Ungogo.

SAMPLING/SAMPLING TECHNIQUE

Fifteen (15) respondents from 5 metropolitan Local Government Areas (LGAs), making a total of 75 were purposively selected. The 5 sampled LGAs are Dala, Fagge, Gwale, Nassarawa and Tarauni. The use of this sampling technique ensures that only those respondents knowledgeable on issues relating to use of generators and capable of answering the questionnaire were selected.

METHODS OF DATA COLLECTION

This paper adopts a *cross sectional descriptive survey,* where data were collected at a point in time from the sample selected. As a primary – based research, the paper employed a structure questionnaire consisting of both open – ended and closed – ended multiple questions using a five-point likert scale. Also, interview

and personal observations were used to complement the findings of the study. The interviews were conducted with (5) stakeholders and experienced persons on issues related to the environment (1), industry (2) and health (2).

METHOD OF DATA ANALYSIS

Results were analysed in the paper using descriptive statistics. This involves the use of statistical tools such as percentages, mean score and chi-square test in order to draw meaningful conclusions.

DATA PRESENTATION AND ANALYSIS

DATA ANALYSIS AND INTERPRETATION

Out of the seventy-five (75) questionnaires administered, sixty-six (66) questionnaires were fully completed and returned. Therefore, the analysis and interpretation of data were based on the returned questionnaires.

DISTRIBUTION OF RESPONDENTS: Table 2 shows the distribution of the respondents by their occupation where 31 of the respondents were households (47%) and 35 of the respondents were businessmen (53%) of the total respondents.

TABLE 2: DISTRIBUTION OF RESPONDENTS BY OCCUPATION

Occupation	Frequency	Percentage (%)
Households	31	47
Businessmen	35	53
Total	66	100

Source: Field Survey, 2011

The respondents were considered to be the regular users of generators to substitute the electricity supplied by the government or to complement where necessary. It has been observed that in Kano metropolis, one out of every five house has a generator and barely all business outfits have generator(s).

ECONOMIC IMPLICATIONS OF USING GENERATORS AMONG HOUSEHOLDS IN KANO METROPOLIS

The responses in table 3 below show the extent to which households attested to the fact that use of generators has a negative economic implication on their incomes and consumption expenditures. Precisely, 13 of the respondents representing (42%) maintained that use of generators effects their consumption very much, while 7 said much, 6 moderate, 1 low and 4 very low representing 23%, 19%,3%, and 13% respectively. On the other hand, 14 of the respondents considered the severe impact of the use of generators as alternative source of energy in Kano metropolis on income, 8 respondents considered it much, 3 respondents moderate, 1 respondent low and 5 respondents very low, representing 45%, 26%, 10%3% and 16% of the total respondents, respectively.

TABLE 3: ECONOMIC IMPLICATIONS OF USING GENERATORS AMONG HOUSEHOLDS

Responses	Income	Percentage (%)		Consumption	Percentage (%)
Very much	14	45		13	42
Much	8	26		7	23
Moderate	3	10		6	19
Low	1	3		1	3
Very low	5	16		4	13
Total	**31**	**100**		**31**	**100**

Source: Field Survey, 2011

Therefore, the overall result shows that the use of generators by households has a serious negative economic implication on their consumptions and incomes. The consequences of this outcome is that excessive use of generators has a tendency to reduce consumers' effective demand and thereby leading to fall in aggregate demand in the country with adverse effects on national income and employment. That would go a long way in reducing purchases and by extension production in Kano and the country at large, given the central place of Kano in Nigeria.

ECONOMIC IMPLICATIONS OF USING GENERATORS AMONG BUSINESSMEN IN KANO METROPOLIS

Table 4 shows the economic implication of using generators on cost of production and profit. On the cost of production, 16 respondents conceded to the fact that use of generators as altrernative source of energy has a very high economic impact, 9 respondents see the impacts as high, 5 respondents considered the impacts as moderate, 4 respondents viewed it as low and only 1 considered the impact very low, representing 46%, 26%, 14%, 11% and 3% respectively. In view of that, therefore, the result implies that the cost of generating power in Nigeria is very high and it is the main portion of the total production cost. This result is also in line with the World Bank Report in 2004, "manufacturing firms in Nigeria consider inadequate infrastructure particularly power supply as their most severe constraint".

TABLE 4: ECONOMIC IMPLICATION OF USING GENERATORS ON BUSINESSMEN

Responses	Production cost	Percentage (%)		Profit	Percentage (%)
Very high	16	46		9	26
High	9	26		7	20
Moderate	5	14		4	11
Low	4	11		1	3
Very low	1	3		14	40
Total	**35**	**100**			**100**

Source: Field Survey, 2011

However, on the profit side, the result is quite the opposite case. From table 4.4, 9 respondents consider the effects of using generators on the profits of businessmen positively as very high, 7 high, 4 moderate, only one (1) chose low while 14 chose very low representing 26%, 20%, 11%, 3% and 40% respectively. This result is the reflection of the fact that more and more costs of production are shifted to the final consumers whose disposable incomes continue to become powerless against the double digit inflation mainly caused by excessive use of generators in the country. In spite the cost of purchase and maintenance of generators; firms do realize fair profits thereby retaining them in business, while the cost is being shifted to the buyers.

ENVIRONMENTAL POLLUTION IMPACT OF THE USE OF GENERATORS IN KANO METROPOLIS

The results of table 5 show the extent to which the respondents agree that the fact that use of generators causes environmental pollutions. From the table, 47 respondents strongly agreed, 12 agreed, 3 strongly disagreed, 2 disagreed and the remaining 2 are undecided representing 71%, 18%, 5%, 3%, and 3% respectively. Therefore, the result implies that use of generators causes environmental pollutions to a great extent, since only few or insignificant number of respondents disagreed that use of generators causes environmental pollution. The outcome of this result also confirms exactly what the outcome of the interview conducted with an environmental expert reveals.

TABLE 5: ENVIRONMENTAL POLLUTIONS CAUSED BY THE USE OF GENERATORS

Responses	Environmental Pollutions	Percentage (%)
Strongly agree	47	71
Agree	12	18
Strongly disagree	3	5
Disagree	2	3
Undecided	2	3
Total	**66**	**100**

Sources: Field Survey, 2011

To corroborate this finding, the response of the environmental expert to the question asked concerning environmental implication of using generators was that, "it is obvious that diesel generator sets have a lot of pronounced environmental effects in our society today. One of the most sources of air pollution today in our society is exhaust gasses release through the use of generators. These exhaust gasses have considerable effects on many aspects of our environment. The effects were not limited to our urban areas, but they are now extending to even the rural areas".

HEALTH IMPLICATIONS OF THE USE OF GENERATORS

From table 6 below, 53 respondents representing 80% of the total respondents are of the view that air pollution from the use of generators causes various health problems which include birth defects (9%), eye irritation (28%), repository infections (38%), cancer (8%), and asthma (17%). While 13 respondents representing (20%) of the total 66 respondents did not believe that air pollution causes some health problems. Eight (8) out of the total 13 respondents chose birth defects and the remaining five (5) chose cancer representing (62%) and 38% respectively.

TABLE 6: HEALTH IMPLICATION OF AIR POLLUTION FROM THE USE OF GENERATORS

Health Problems	Yes	Percentage (%)	No	Percentage (%)
Birth defects	5	9	8	62
Eye irritation	15	28	-	-
Repository infections	20	38	-	-
Cancer	4	8	5	38
Asthma	9	17	-	-
Total	**53**	**100**	**13**	**100**

Source: Field Survey, 2011

This result, therefore, indicates that the perceived believe about the health implication of air pollution from the use of generators causes mainly eye irritation and repository infections while birth defects and cancer are the least expected negative consequences of air pollution. This is also in line with the outcome of the personal interview conducted with some health specialists. One of them declared that, "air pollution from the use of generators is one of the common causes of repository infections among working class, most especially machine operators.

HEALTH IMPLICATION OF NOISE POLLUTION FROM THE USE OF GENERATORS

From table 7 below, 60 respondents representing 91% of the total respondents agreed that noise pollution from the use of generators causes various health problems, while only 6 respondents representing 9% of the total respondents did not agree that noise pollution causes some health problems. Out of the total 60 respondents that agreed, 25 of them chose hearing loss, 3 chose preventing sleeping, while the remaining 2 chose irritability representing 42%, 5%, 8%, 42% and 3% respectively. And out of the 6 respondents that did not agree noise pollution from the use of generators causes mainly hearing loss and prevents sleeping while it has least effect on stress and irritability.

TABLE 7: HEALTH IMPLICATION OF NOISE POLLUTION FROM THE USE OF GENERATORS

Health Problems	Yes	Percentage (%)	No	Percentage (%)
Hearing loss	25	42	-	-
Induces stress	3	5	2	33
Causing inefficiency	5	8	-	-
Preventing sleeping	25	42	-	-
Causing irritability	2	3	4	67
Total	**60**	**100**	**6**	**100**

Source: Field Survey, 2011

This result also confirms what one of the health specialists said during the interview, "noise pollution in most urban Nigerian cities is responsible for hearing loss (deaf) and insomnia". He further added that, "medical cases like hypertension, ulcer, acid reflux diseases, asthma, and snoring are common cases associated with insomnia".

HYPOTHESES TESTING

FIRST HYPOTHESIS: The researcher adopted the chi-square test of goodness-of-fit to test the hypotheses formulated. The hypotheses were tested in turn. Thus,

H0: Use of generators does not give rise to social costs.

TABLE 8: OBSERVED AND EXPECTED FREQUENCIES FOR SOCIAL COST

Responses	Observed Frequency (Oi)	Expected Frequency (Ei)
Strongly agree	35	13.2
Agree	10	13.2
Strongly disagree	15	13.2
Disagree	3	13.2
Undecided	8	13.2
Total	**66**	**66**

Source: Field Survey, 2011

Notes:

(i) The observed frequencies (Oi) are from the responses of the respondents regarding social costs of using generator sets.

(ii) While the expected frequencies (Ei) are obtained using the formula below:

$$Ei = \frac{\text{Total Frequencies}}{\text{Number of observations}}$$

Where $Ei = \frac{66}{5}$ *then* $Ei =$ ***13.2***

TABLE 9: COMPUTATION FOR CHI-SQUARE STATISTICS

Oi	Ei	O i- Ei	(Oi - Ei)2	(Oi - Ei)2 / Ei
35	13.2	21.8	475.24	36.00303
10	13.2	-3.2	10.24	0.775758
15	13.2	1.8	3.24	0.245455
3	13.2	-10.2	104.04	7.881818
8	13.2	-5.2	27.04	2.048485
Total				**46.95455**

Source: Computed by the researcher using Microsoft Excel 2007

Note: *The theoretical chi-square (χ^2_{tab}) depends on:*
(i) Degree of freedom (d.f) = (R-1) (C-1)
Where, R= 5
C=2
Therefore, d.f= (5-1) (2-1) = 4 x 1= 4
(ii) At 5% level of significance:
α = 0.05 (a one tail-test)
Thus, $\chi^2_{0.05}$ = 9.49
The value of the chi-square above is obtained from the chi-square distribution table using 5% level of significance and 4 degree of freedom.

INTERPRETATION

The null hypothesis (**H0**) is rejected, since chi-square calculated (46.95455) is greater than chi-square tabulated (9.49) at 5% level of significance. Therefore, it could be concluded that the use of generators gives rise to social costs ranging from high cost of doing business, pollution of the environment, rising prices, increasing health problems and reduction in purchasing power in Kano metropolis. This position conforms to the postulates of the social cost theory, "the more reliance an economic system places on private incentives and the pursuit of private gain the greater the danger that it will give rise to external 'unpaid' social costs unless appropriate measures are taken to avoid or at least minimize these costs (Kapp, 1963)".

CONCLUSIONS

It can be concluded that use of generators among households and businessmen in Kano metropolis has reduce consumers' effective demand and businessmen in Kano metropolis spent huge amount of money in running generators thereby raising their cost of production and hence prices. It could be inferred that such increase in cost of production in the country generally is responsible for the double digit inflation of about 11.2% in 2010 in Nigeria.

It can also be concluded that use of generators produces unwanted noise, emits dangerous fumes into the air, and also releases heavy contaminants into the water and soil thereby causing environmental degradation. Kano metropolis is considered fore among the victims of such environmental problems. Other consequences include various health problems, external 'unpaid' social costs which shifted to and borne by innocent third parties, or more generally by the society as a whole.

RECOMMENDATIONS

On the basis of the conclusions reached in the paper, the followings recommendations were made:

1. General public and particularly the users of generators should be sensitized on their implications on health so that preventive efforts would be taken thereby reducing particularly, its adverse consequences;
2. That government and the private sector should be encouraged to put heads together in generating solar energy or in the form of Public Private Partnership arrangement;
3. That government should do everything possible to ensure steady and reliable source of energy which would go a long way in reducing the arbitrary usage of generators in Kano in particular and Nigeria in general. That by extension would guard against all the adverse effects of such usage of generators as revealed by numerous studies.

BIBLIOGRAPHY

Agba, M.S. (2011) "*Energy Poverty and Leadership Question in Nigeria*: An overview and Implications for the future." Journal of public Administration and Policy Research Vol.3 (2): pp. 48-51

Ajanaku, L. (2007) "Battling with Darkness" TELL (Special Edition) May, 21, 2007. PP. 31-33

Aster, G. (2006a) "Power Shortage Takes Toll on Economy". The Punch, June 8, 2006. Pp.28

Bailey, D.M. (1997) "*Research for the Health Professional*: A Practical Guide." Second edition, Philadelphia, PA: FA Delhi.

Baker Institute Energy Forum (2008). "Poverty Energy and Society." http://www.nice.edu/energy/research/povertyandenergy/index.html.

Central Bank of Nigeria (2009). "Statistical Bulletin". Vol. Abuja: CBN publication. Doyle, M.D.C. and Sambo, A.S. (1988): "*Correlation of Diffuse Solar Radiation with Air Mass*." Solar and Wind Technology Vol5 (1) pp.99-102

ECN (2005) "Energy Commission of Nigeria: *Renewable Energy Master Plan*", Executive summary, Lagos Nigeria.

EIA (2007) "Energy Information Administration: World Proved Resources of Oil and Natural Gas. Most Recent Estimations." Available at: http://www.eia.doe.gov.june,2007.

Folayan C.O. (1988) "*Estimate of the Global Solar Radiation Bound for Some Nigeria cities*". Nigerian Journal of Solar Energy. Vol. 5 pp16-24

Ibitoye, F. and Adenikinju, A. (2007) "*Future Demand for Electricity in Nigeria*". Applied Energy 84-pp.492-504

INFORSE (2009). Energy Poverty Recommendations for INFORSE-Europe. International Energy Agency, "Access to Electricity," *World Energy Outlook 2009* and 2010.

Iwayemi A. (2008a) "Nigeria's Dual Energy Problem: Policy uses and Challenges." International Association for Energy Economics pp.17-21

Iwayemi A. (2008b) "Investment in Electricity Generation and Transmission in Nigeria: Issues and Options." International Association for Energy Economics P37-42

Kapp. K.W. (1963) "*Social Cost of Business Enterprises*". A Review of the Critical Economic Theories (Second Edition).

Manafa, N. (1995) "*Electricity Development in Nigeria*." Rasheen Publisher, Lagos, Nigeria pp37-51

NEWSWATCH (2008) "The Energy Crisis." Nigeria's weekly News-magazine, March 3, 2008-p22-29

Obadote, D.J. (2009) "Energy Crisis in Nigeria: Technical Issues and Challenges." Power Sector Prayer Conference, June 23, 2009: pp.25-27

Odiaka, P. (2006) "Power Sector Reform: Still a reign of blackout." The Guardian, August 24, 2006. P15

Onyeji, I. (2010) "*Determinant of Energy Poverty In Sub-Saharan Africa*". Publisher-African Institute of Applied Economics, Enugu, Nigeria.

Popoola J.J. and Megbowon I.O. (2007) "Environmental *and Cost Comparative Analysis between Generator set and Solar as Alternative Energy Sources*." NITEL Repeater stations- a case study. Journal of Engineering and Applied Science. Vol.2 (2) pp.332-335

Uche, C.P. (2008) 'Energy Access In Rural Areas." Abuja-The Workshop on Energy Poverty in Africa by OFID.

Udeajah, G.(2006) "Industrial Firms Lose N38b to Power Outages" The Guardian, August 24, 2006. P29
Sambo A.S. (2008). "Matching Electricity Supply with Demand in Nigeria." International Association for Energy Economics.
Sambo, A.S. and Doyle M.D. (1986). "Estimation of the Global and Diffuse Components of Solar Radiation for Some Nigerian Cities," Nigerian Journal of Solar Energy. Vol.5 pp16-24
World Economic Forum (2010), "Energy Poverty Action".

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