

**GREEN BUILDING FOR NIGERIA PUBLIC INSTITUTIONS TOWARDS  
EFFECTIVE ADMINISTRATION OF PUBLIC PROPERTIES: A CASE STUDY OF  
MILITARY BARRACKS AND POLICE STATIONS IN ANAMBRA STATE,  
NIGERIA**

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**ABSTRACT:** *Despite the huge environmental and energy problem in Nigeria/designers have not seen the need for a shift from their traditional method of designing buildings. This study proposes the adoption of green building concept for Nigeria public institutions as a way of enhancing effective administration of public properties, with reference to military barracks and police stations in Nigeria. observations as a primary source of data was used to gather information's because of the military and police headquarters in Anambra state refused to grant interviews. Secondary data sources was also used. Findings/observations made from the study showed that the barrack buildings and premises including some part of the premises need renovation urgently. It was also found out that due to poor electricity supply, households of police officers and their offices resort to informal power supply which contributes to global warming. The paper recommends that there is need for a holistic adoption of green design either in new or old building as lack of it has been observed to be adverse to efficiency in buildings and environmental sustainability in Nigeria, most especially public institutions.*

**KEYWORDS:** Green Building, Public Properties,

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## **INTRODUCTION**

Green building (also known as green construction or sustainable building) refers to a structure and using process that is environmentally responsibly and resource-efficient throughout a buildings life-cycle from sitting to design, construction, operation, maintenance, renovation, and demolition. This requires close cooperation of the design team, the architects, the engineers and the client at all project stages. The green building practice expands and complements the classical building concerns of economy, utility, durability, and comfort. Although new technologies are constantly being developed to complement current practices in creating greener structures, the common objective is that green buildings are design to reduce" the overall impact of the built environment on human health and natural environment.

The term "green" and "sustainable design is often used interchangeably, though there are shades of meaning implied by each. Green building measures can lead not only to lower building operating expenses through reduced utility and waste disposal. Cost, but also to lower ongoing building maintenance cost ranging from salaries to suppliers. The emphasis is on efficiency. Sustainability is a goal that allows for the continuing improvement of standard of living without reversible damage to resources we need to survive as species (Lehrer, 2001). The green approach to Architecture is not something new as it has existed for years. What is new is the realization that green approach to the built environment involves a holistic approach

to the design of buildings; that all the resources that go into a building, be they materials fuels or the contribution of the users need to be considered if sustainable architecture is to be produced (Brebde an vale, 2007).

In Nigeria some buildings embody one of the various verifiable characteristics of green design. Buildings with holistic approach are yet to be seen. Sustainable development is the challenges of meeting growing human needs for natural resources, industrial products, energy, food, transportation and effective waste management while conserving and protecting environmental quality and the natural resource base essential for future life and development. This concept recognize that meeting long term human needs will be impossible unless we also conserve the earth's natural, physical and chemical system (Gottfried, 1996). This is also in tandem with environmental sustainability. There is no doubt that sustainable development concept, applied to design, construction and operation of buildings can enhance institutions, communities in Nigeria and other third world countries. This is more apt in this era of climate change. However, according to Nwafor (2006), the evolution of the concept in the 1990's to encompass the economic, social and environmental points of view made the concept a driving force. The economic point deals with growth, efficiency and stability. The social aspect is concerned with poverty, cultural heritage and empowerment while the environmental aspect deals with biodiversity/resilience natural resources and pollution.

Embracing green or sustainable concept in design is aimed at reducing energy, operation and maintenance cost, reduce building related illness, increase the productivity and comfort of building occupants, reduce waste and pollution and increase building and component durability and flexibility. It is important that the focus of green concept be embraced from the early stages of building, planning and construction.

According to Gottfried (1996), the decision made at the first phase of building design and construction can significantly affect the costs and efficiencies of other phase as recent studies have shown that green building measures taken during construction or renovation can result in significant building operational savings, as well as increases in employee productivity. In essence, building related costs are best revealed and understood when they are analyzed over the life span of the building. In Nigeria, green concept, sustainability and environmental issues are hardly put into consideration when designing a new building or renovating an old one. According to Otegbulu (2011), these results in a short fall in user satisfaction, functional space planning, service type and in addition sustainable building components are often neglected during design and construction.

### **Aim and Objectives**

The aim of this paper is to depict measures to be undertaken by adopting green concept for Nigeria public institutions towards effective administration of public properties such as military and police barracks and stations and also the common objectives of green buildings designed to reduce the overall impact of the built environment on human health and the natural environment by:

- Efficiently using energy, water and other resources
- Protecting occupant health and improving employee productivity.
- Reducing waste, pollution and environmental degradation.

### **Energy Efficiency**

Green buildings often include measures to reduce energy consumption both the embodied energy required to extract, process, transport and install building materials and operating energy to provide services such as heating and power equipment.

As high-performance buildings use less operating energy, embodied energy has assumed much greater performance and make up as much as 30% of the overall life cycle energy consumption. Studies such as the U.S LCI data base project show buildings built primarily with wood will have a lower embodied energy than those built primarily with brick, concrete, or steel. To reduce operating energy use, designers use details that reduce air leakage through the building envelope (the barrier between conditioned and unconditioned space). They also specify high-performance windows and extra insulation in walls, ceilings and floors.

### **Water Efficiency**

Reducing water consumption and protecting water quality are key objectives in sustainable building. The protection and conservation of water throughout the life of a building may be accomplished by designing for dual plumbing that recycle water in toilet flushing or by using water for washing of the cars. Waste water may be minimized by utilizing water conserving fixtures such as ultra-low flush toilets and low-flow shower heads.

### **Waste Reduction**

Green architecture also seeks to reduce waste of energy, water and materials used during construction. For example, in Anambra state nearly 60% of the state's waste comes from commercial buildings. During construction phase, one goal should be to reduce the amount of material going to landfills. Well designed buildings also help reduce the amount of waste generated by the occupants as well, by providing on-site solutions such as compost bins to reduce matter going landfills.

### **Management Theory**

The theory of management is the synthesis of the concept and principles of management. The systems approach to management encourages management to perceive the internal and external environmental factors as an integrated whole. Every system is made up of sub-systems. These sub-systems are inter-dependent. When any of them fails to function effectively, the entire system experiences a severe setback.

To work towards creation of sustainable development of green building for Nigerian public institutions for effective maintenance of public properties, one must understand the environmental impacts of buildings and their relative importance. According to Lehrer (2001), the most and best understood impact is caused by energy used in building operations. Udechukwu and Johnson (2008), describes green buildings as a generic term that generally refers to the practice of increasing the efficiency and performance of building through better sitings, design, construction, operation and maintenance. They (Udechukwu and Johnson) further submitted that conventional construction methods have been linked to environmental damage, including depletion of natural resource, air and water pollution, toxic waste and global warming. Conventional buildings have a significant impact on the environment including wetland depletion and deforestation (Otegbulu, 2007). Conventional construction methods do

not take sustainability into consternation and are not environmentally friendly. The method is not able to strike a balance between environmental social and economic considerations.

- Indirect social service
- Provision of revenue for the public purse

However, Emoh (2004) explicitly stated two important components of real estate administration namely human element and physical element. The physical element is the land component while human element is the entrepreneurial and managerial resources. The physical component, land, is relatively static and only changes in quality or size if acted upon by an outside force. The human element, entrepreneurial and managerial resources is a dynamic factor which acts to bring about change. It is the factor that acts to bring about development in the general land resources scene. It exists to conceptualize, plan, prosecute, maintain and control development in the land resource scene. It is therefore the more important component of land/public estate administration in national development will largely depend on the extent to which its entrepreneurial and managerial component is able discharge its legitimate duties.

### **Study Location and Situational Context**

The study area is Awka South Local Government Area, Anambra State. The subject properties are known as the Anambra State Nigeria Police Headquarters and Barracks along Zik's Avenue, Awka. These properties can be accessed through the popular Zik's Avenue, which takes its route from three major roads namely: Amawbia-Ekwulobia Road, Anambra-Abagana Road, Nibo Road.

The development i.e Anambra State Nigeria Police Headquarters has 3 nos. 1 storey building. It also has a bungalow building on the right side of the premises and a small reception building where visitors sign-in before making entry into premises. There is also a car park built inside the premises where the police Commissioner and other senior police officers park their vehicles. The premise is well fenced, while the barrack behind the prison has 5nos. 1 floor building i.e. bungalows. The barrack is not fenced. Some part of the barrack premises are used for subsistence farming by police officers. These buildings appear very old.

### **MATERIALS, METHODS AND ANALYSIS**

**Material:** the various development site at the police headquarters are constructed with the following materials:

3nos. 1 storey building:

**Doors:** the doors on the ground floor and first floor are made or fitted with the plywood flush door type with some that has a burglary proof except for the door fixed at the police Commissioner's office which is a bullet proof door.

**Windows:** the windows of the 3-buildings are made glass/aluminum sliding window types with welded metal bars as anti-burglary devices.

**Ceilings:** the ceiling on the ground floor is of mass reinforced concrete, while the ceiling on the first floor is fitted with the asbestos ceiling type.

**Floor:** The open space in the premises is of mass reinforced concrete in sand/cement screed, while the floor of the buildings is tiled.

**Roof:** The roofs are made up of long span aluminum roofing sheets attached onto timber trusses.

**Fittings:** Surface wiring system was used.

**Walls:** The walls are made of sandcrete block walls which are rendered smoothly with sand/cement screed. Both the internal and external are painted.

Materials used for constructing the bungalows at the barrack are:

**Doors:** The doors are made with the plywood flush door type with some that has a burglary proof.

**Windows:** The windows are made of wooden casement types with welded metal bars as anti-burglary device.

**Ceilings:** The ceilings are with the asbestos ceiling type.

**Floor:** The floors are of mass reinforced concrete in sand/cement screed.

**Roof:** The roofs are made up of zinc roofing sheets attached onto timber trusses.

**Fittings:** Surface wiring system was used.

**Walls:** The walls are made of sandcrete block walls which are rendered smoothly with sand/cement screed. Both the external walls are painted.

## METHODS

The methods adopted in gathering information for this paper work are from both primary and secondary sources.

The primary source is through observation because the police commissioner did not give approval for interview or issuing of questionnaires and carrying out of thorough inspection based on the current security issues affecting the country, while the secondary data source are from textbooks, journals, online internet materials etc.

### Analysis

From the observations made, since the police Commissioner did not give approval for interview it was very glaring that they don't understand the Green Building concept.

It was also observed that the 3-major buildings in the Anambra State Nigeria Police Headquarters was renovated probably to attain a significant building operational saving, as well as increases in employees (Police officers) productivities. The buildings design adopted was the conventional construction methods and using such method might lead to

environmental damage, including depletion of natural resources, air and water pollution, toxic waste and global warming. All these have a significant impact on the environment including wetland depletion and depreciation.

Also from observation, due to poor power situation in the country, employees of the Headquarter don't have electricity to power their air conditioners, computers, phones and security gadgets. This is a serious problem considering the socio-economic importance of electricity to a police headquarters.

Frequently, private electricity generators as alternative power supply are used to light up the premises. Therefore, frequent use of generator has obvious implications which include defacing of building walls and premature death from inhalation of carbon monoxide and global warming. The barracks has a very large canal near it and these breeds' mosquitoes and other dangerous reptiles. Even the bungalow buildings housing policemen inside the barracks is in deplorable state. From observation, the buildings fabrics are worn out and decayed.

## CONCLUSION

Like the design process, the design of green buildings and sustainable environment involves creative arrangement of components and details to meet a set of specifications/guidelines subject to other constraints. Results from the observation at the Anambra State Nigeria Police Headquarters indicate that their management/Nigerians in general are not green conscious in building design and environmental management. The rampant use of generators both at the Headquarters and barrack most of which are substandard instead of adoption of natural ventilation and lighting in their design is a practical indication of a nation which is not conscious of the link between environment, good health and economic developments. In order to avert a gloomy future for our environment, there is need to reduce to bare minimum the use of non-renewable resources, manage renewable resources to achieve sustainability and reduce toxic and harmful emissions to the environment.

## RECOMMENDATION

- There is need for a holistic adoption of green design as lack of it has been observed to be adverse to efficiency in buildings and environmental sustainability in the Headquarter and barrack.
- Awareness should be created among Nigerians on the importance of green and sustainable design in their homes and places of work.
- The power situation in the country should be given urgent and serious attention to reduce the resort to informal power sources which contribute to global warming.
- The barrack building housing the police officers and their families should be renovated in line with green design concepts.
- Government should include in their power policy incentives to encourage energy efficiency instead of building more power stations.

## REFERENCES

- Addae-Dapaah, K., Hiang, L.K., and Sharon N.Y.S. (2009). Sustainability of Sustainable Real Property Development. *The Journal of Sustainable Real Estate*, 203-225.
- Brenda and Vale, R. (2007). *Principles of Green Architecture. The Sustainable Urban Development*.
- Egolum, C.C. Estates. Printed by Snaap press Ltd. 1 Snaap Drive, Independent Layout, P.O. Box 11202, Enugu.
- Emoh, I.F. (2004). *Real Property Investment and Management*. Christian press, 1777 Nnamdi Azikiwe Avenue, Awka, Anambra State.
- Gottfried, D.A. (1996). *The Economics of Green buildings is Sustainable Technical Manual*. Public Technology Inc. U.S.A.
- Howe, J.C. (2010). Overview of green buildings *National Wetlands Newsletter*, 33 (1).  
[Http://www.gov/greenbuilding/pubs/components.html](http://www.gov/greenbuilding/pubs/components.html).
- Lehrer, D. (2001). *Facility Design and Management Handbook*. McGraw-Hill New-York.
- Newmann, M. (2007). *Commercial green buildings. The Business case Realtors Commercial Alliance*, Issue 6, Fourth Quarters.
- Nwafor, J.C. (2006). *Environmental Impact Assessment for Sustainable Development*, Eldermark publishers, Enugu Nigeria.
- Oladokun, T.T. (2010). *Sustainable property Management Practice in nigeria Proceedings of International Research Conference on Sustainability in Built Environment, Columbia, Sri Lanka*, pp. 157-165.
- Otegbulu, A.C. (2005). *Capuring the Hidden Values of Urban Wetlands as a Strategy for Sustainable Wetland Development. Proceedings of the 35<sup>th</sup> Annual Conference of the Nigeria Institution of Estate Surveyors and Valuers, on Development of Nigerian Wetlands*, 42-52.
- Otegbulu, A.C. (2011). *Economics of Green Design and Environmental Sustainability. Journal of Sustainable Development*, 240=245.
- U.S. Environmental Protection Agency. (2009). *Green Building Home*. Retrieved November 28, 2009 from
- Uzoigwe, C.C., and Emoh, I.F. (2012). *Elements of Real Estates Management*. Chilar Ventures Limited, Plot 7 Sade Sobaki Street, Ona-Ara Bus stop, Ipaja Ayobo, Lagos.