

**EVALUATION OF THE ADOPTION OF SUSTAINABLE DESIGN  
STRATEGIES IN LARGE-SIZED HOTELS IN LAGOS, NIGERIA**

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**AUGUST, 2024**

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**BY**

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ARCHITECTURE, COLLEGE OF SCIENCE AND TECHNOLOGY,  
COVENANT UNIVERSITY, OTA, OGUN STATE, NIGERIA**

**AUGUST, 2024**

## **ACCEPTANCE**

This is to certify that this thesis has been accepted in partial fulfilment of the requirements for the award of the degree of Doctor of Philosophy (Ph.D.) in Architecture in the Department of Architecture, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria.

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## **DECLARATION**

**I, OKORIGBA, REGINA KEVWE (19 PCA02012)**, declare that I carried out this research under the supervision of Dr. Isidore C. Ezema and Dr. Eghosa N. Ekhaese of the Department of Architecture, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria. I attest that this thesis has not been presented either wholly or partially for the award of any degree elsewhere. All the sources of materials and scholarly publications used in this thesis have been duly acknowledged.

**OKORIGBA, REGINA KEVWE**

**Signature and Date**

## CERTIFICATION

We certify that the thesis titled “**EVALUATION OF THE ADOPTION OF ENVIRONMENTALLY SUSTAINABLE DESIGN STRATEGIES IN LARGE SIZE HOTELS IN LAGOS, NIGERIA**” is an original research work carried out by **OKORIGBA, REGINA KEVWE (19PCA02012)** of the Department of Architecture College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria under the supervision of Dr. Isidore C. Ezema and Dr. Eghosa. N. Ekhaese. We have examined the work and found it acceptable for the award of the degree of Philosophy in Architecture.

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## **DEDICATION**

This research work is dedicated to the Triune God - God the Father, God the Son, and God the Holy Spirit; the two hearts of love - the most Sacred Heart of Jesus and Immaculate Heart of Mary; my all and all, the giver of wisdom, knowledge, and understanding. This can only be GOD. This work is also dedicated to my husband, Mr. Pius O. Okorigba, for his love and financial support, and to my adorable children: Urinrioghene, Ogheneruno, Ejokoghene, and Ebruphiyo, for their encouragement and love. In addition, the work is dedicated to my late father, Chief Dickson T. Ode, who desired that I attain the highest level of education, and to my ever-loving and most cherished mother, late Mrs. Mary Erhikarovwon Ode, who transited to glory as I was writing the first draft of this thesis, for her unwavering love and prayers.

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## LIST OF ABBREVIATIONS AND SYMBOLS

<b>AMR:</b>	Automated Meter Reading
<b>BREEAM:</b>	Building Research Establishment Environmental Assessment Method
<b>CASBEE:</b>	Comprehensive Assessment System for Built Environment,
<b>CO<sub>2</sub>:</b>	Carbon dioxide
<b>COVID 19:</b>	Corona-virus Disease Infectious Disease 2019
<b>CSR:</b>	Corporate Social Responsibility
<b>DECoRuM</b>	Domestic Energy, Carbon Counting, and Carbon Reduction Model
<b>EEP:</b>	Energy Environmental Prediction Tool
<b>EMAS/ EUROPE:</b>	The EU Eco-Management and Audit Scheme-
<b>ERS:</b>	Energy Reduction Strategies
<b>GBCN:</b>	Green Building Council of Nigeria
<b>GDP:</b>	Gross Domestic Product
<b>GeSBC:</b>	German Sustainable Building Council
<b>GHG:</b>	Greenhouse Gases
<b>GSTC:</b>	Global Sustainable Tourism Council
<b>HQE:</b>	High Environmental Quality
<b>HVAC:</b>	Heating, Ventilation, and Air Conditioning
<b>IPCC:</b>	Intergovernmental Panel on Climate Change
<b>ISO:</b>	International Organisation for Standardisation
<b>ISO 14001:</b>	International Organisation for Standardization 14001
<b>ISO 14004:</b>	International Organisation for Standardization 14004
<b>ITF:</b>	Industrial Training Fund
<b>LED:</b>	Light- Emitting Diode
<b>LEED:</b>	Leadership in Energy and Environmental Design
<b>R&amp;D:</b>	Research and Development
<b>SBTOOL:</b>	Sustainable Building Tool
<b>SCP:</b>	Sustainable Consumption and Production
<b>SDGs:</b>	Sustainable Development Goals
<b>SDG 6:</b>	Sustainable Development Goal 6
<b>SDG 7:</b>	Sustainable Development Goal 7
<b>SDG 11:</b>	Sustainable Development Goal 11
<b>SDG 12:</b>	Sustainable Development Goal 12

<b>SDG 13:</b>	Sustainable Development Goal 13
<b>SDS:</b>	Sustainable Design Strategies
<b>UN:</b>	United Nations
<b>UNSDGs:</b>	United Nations Sustainable Development Goals
<b>UNWTO:</b>	United Nations World Trade Organisation
<b>USEPA:</b>	United States Environmental Protection Agency
<b>VOCs:</b>	Volatile Organic Compounds
<b>WCS:</b>	Water Conservation Strategies
<b>WGBC:</b>	World Green Building Council
<b>WMS:</b>	Waste Minimisation Strategies
<b>WTO:</b>	World Trade Organization
<b>WTTC:</b>	World Travel and Tourism Council

## ABSTRACT

Hotels as part of the physical components of the built environment are increasingly embracing practices that promote environmental sustainability in design and operations. In Lagos, Nigeria, hotels are growing in large numbers in response to economic indices. It has been observed that the hospitality industry is energy-intensive, consumes large volumes of water, and generates huge amounts of waste with attendant effects on the ecological environment. A potent way of promoting sustainability in the hotel industry and reducing the adverse environmental impact of hotel buildings is the adoption of Sustainable Design Strategies (SDS). This study evaluated the adoption of SDS in large-sized hotels in Lagos, Nigeria, to identify the factors that influenced this. A mixed-method research design was employed for the study. A comprehensive literature review was done to ascertain the predominant SDS adopted in hotels. This formed the basis for the design of the questionnaire administered to 140 Hotel Managers drawn from 20 large-sized hotels and 60 Architects from 16 registered architectural firms involved in the design of the hotels. These were complemented with data sourced from oral interviews, field observations, and photographic instrument of data collection. The quantitative data were analysed using descriptive statistics and mean ranking using Statistical Package for Social Sciences (SPSS), Version 20. while content analysis was used to analyse the qualitative data. The study identified 37 SDS with the reuse programme being the most commonly adopted strategy in the design of hotel buildings reviewed. In the study area, it was observed that about 93 % of the design professionals who designed the hotels investigated were very much aware of energy reduction strategies, 86 % were aware of water conservation strategies, and 91% were aware of waste minimisation strategies. In contrast, about 70% of the Hotel Managers sampled were aware of energy reduction strategies, 45 % aware of water conservation strategies, and 67% were aware of waste minimisation. Further, about 91% of the design professionals have adopted energy reduction strategies, 73% have adopted water conservation strategies, and 46% have adopted waste minimisation strategies. For the Hotel Managers, 65 % have adopted energy reduction strategies, 40% have adopted water conservation strategies, and 61% have adopted waste minimisation strategies. This study also revealed that both the design professionals and Hotel Managers ranked energy-saving bulbs, low-flush toilets, and placement of dustbins as the most adopted strategies for energy reduction strategies, water conservation strategies, and waste minimisation strategies, respectively. Alternative energy sources, watering green spaces at night, covering swimming pools, and reuse programme/recycling ranked the least adopted strategies for energy reduction strategies, water conservation strategies, and waste minimisation strategies for both design professionals and Hotel Managers, respectively. Even though, the result on the level of awareness corroborates that on the extent of adoption of SDS, the cost associated with SDS and the availability of adequate and right information were identified as the most significant factors that influenced the adoption of SDS in the survey. The lack of space for solar panel installation, and difficulties in obtaining permits for retrofitting the buildings played a crucial role in the extent of adoption of SDS in the existing hotels in the study area. The study, therefore, concludes by suggesting strategies for improving the level of the adoption of SDS, encouraging retrofitting, and raising awareness of SDS as a framework for enhancing the sustainability of hotel buildings both in design and in operation.

***Keywords: Adoption, Built environment, Design Professionals, Hotel buildings, Hotel Managers Survey, Sustainable design strategies***