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THE NEED FOR GOVERNMENTAL POLICIES AND STRATEGIES IN GREEN BUILDING CERTIFICATION IN GHANA

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Abstract: Green building has received increased attention over the years from both environmental economist and policy makers. The number of buildings put up every year produces a huge impact on the consumption of natural resources. However, only a small number of these buildings can be identified as green buildings. There are several policies implemented in various countries that aim at reducing the environmental impact of buildings on human health and the environment. Some of these policies are voluntary and mandatory programs that affect the entire lives of buildings. This paper aimed at examining the literature regarding current green building strategies and polices in Australia, United States, United Kingdom and South Africa to enable recommendations to be made for its uptake in Ghana. The key finding from the review revealed that governments in these countries play a pivotal role in the promotion and implementation of green building policies and strategies in their various countries. The survey further assisted in identifying the policies and strategies that can be adopted by the government of Ghana to promote green buildings. The government of Ghana is therefore being called upon to wake up and join the call by governments of various countries in building green to help save the environment.

Keywords: Green Building, Green Building Certification, Government Policies, Strategies, green building council

INTRODUCTION

The increasing preoccupation with natural resources availability and the way they are used by the society, particularly the construction industry, have prompted a reflection on both the causes and the solutions for this problem, and the need to introduce and apply sustainable concepts have been long advocated [1]. The number of buildings built every year produce a huge impact on the consumption of natural resources. However, only a small number of these buildings can be identified as 'green buildings' [2, 3]. The construction sector has been accused of its excessive consumption of material resources because of the use of non-sustainable materials, with high values of embodied energy [4, 5]. Therefore, since over 80% of people's time is spent inside buildings [6] it makes the construction sector the ideal vehicle to introduce sustainable guidelines of development, given that resource savings can be achieved [7]. Korkmaz et al. [8] reported that in the United States, buildings consume approximately 40% of all energy, 72% of all electricity and produce 39% of primary greenhouse gas emissions. China consumes 40% of the world's cement and steel every year on the total floor areas of new buildings due to its fast-economic development and urbanization [9]. Adegbile [10] asserts that due to increase in technological advancement and economic growth, building construction has greatly increased and has accounted for almost half of the greenhouse gas emissions and energy consumed due to the energy used in the production and transportation of materials. Brundtland [1] also attributed the excessive consumption of energy and water to the needs of people in terms of comfort and quality of life of modern society. Many recent buildings disregard the needs required by users, such as level of thermal comfort, acoustic comfort, ventilation and indoor air quality, leading to unbearable energy costs over the long term [4]. Therefore, there is the need to reverse this trend and promote practises that seek to maintain the remaining resources in order to sustain humanity.

GREEN BUILDING: BACKGROUND AND DEFINITIONS

The concept of green building was developed in the 1980's as a result of the alarming trends of climate change due to increase in the emissions of CO_2 and scarcity of resources [11]. Richardson and Lynes [12] defined green building as a building which is more resource and energy efficient, releases less pollution into the air, soil and water and is healthier for occupants than conventional buildings. The words 'green' and 'sustainability' are most of the times used interchangeably. Sustainable building means changing the process that cause pollution, non-renewable resource usage into renewable resource-efficient products and processes beneficial for environment and society during the phases of pre-building, building and post-building [13]. A certified green building is mostly used synonymously to "high-performance building", "environmentally friendly building", "sustainable building", and "energy efficient buildings". Landman [14] referred to sustainable buildings as "green" or "environmentally friendly buildings". Adegbile [10] argued that the basic aim of any green building certification system is to set criteria against which to rate a building and provide a score or descriptive rating for that building. Gundogan [13] identified another key element of green buildings as the certification systems or assessment systems or rating tools used to examine the performance of a building and to improve the green building process and strategies.

Several countries around the world have developed their own green building standards. These standards include Building Research Establishment's Environmental Assessment Method (BREEAM) in the UK, Leadership in Energy and Environmental Design (LEED) in the USA, GREEN STAR in Australia, and Comprehensive Assessment System for Building Environmental Efficiency (CASBEE) in Japan. These certification systems offer a menu of building technologies and construction practices, including Water Efficiency, Material Efficiency and Energy Efficiency, Materials and Resources as well as other categories.

The assessment of a building is based on the framework of standards, criteria and requirements that a building project must meet in order to be recognized as "green" [15]. This presupposes that there is a direct link between green building and certification system. The green certification systems have been categorised into two, namely; Qualitative and Quantitative certification systems [16, 17]. The qualitative certification systems are often based on the auditing of buildings, followed by the rating of the assessed criteria, which then results in an overall score for the performance of a building [17]. Examples of the Qualitative certification systems are BREEAM, LEED and Green Star. The quantitative certification systems depend on the physical life cycle approach of the building which requires quantitative input and output data on flow of matters and energy [16] with ATHENA and Eco-Quantum as examples.

— BREEAM

BREEAM was developed in the United Kingdom in 1990 by Building Research Establishment Global Limited [18]. Since then more than 115,000 buildings have been certified in the United Kingdom with an additional 700,000 registered for eventual certification [19]. Say and Wood [20] identified the goal of the BREEAM as a medium to reduce environmental impact, ensure the best environmental practices in design, operation, and management and to increase awareness of the impacts of buildings on the environment. BREEAM has four assessment tools that can be used at different stages of a building's life cycle [21]. These assessment tools include the BREEAM Design and Procurement (D&P), BREEAM Post Construction Review (PCR), BREEAM Fit Out (FO) and BREEAM Management and Operation (M&O) [21]. The BREEAM Design and Procurement is used during the design stage of a building renovation, for a new building, or an extension project. The BREEAM Post Construction Review (PCR) is carried out after the construction is complete to verify the D&P assessment. The BREEAM Fit Out (FO) assessment is employed during major renovations of existing buildings and the BREEAM Management and Operation (M&O) assessment evaluates the performance of a building during its operation [21]. Credits are awarded according to 10 categories for meeting a series of performance criteria. The total number of credits in each category is multiplied by an environmental weighting factor, which considers the relative importance of that category. The scores obtained in each category are added to produce an overall score on a scale of Pass, Good, Very Good, Excellent and Outstanding. Since 2000, the government in UK has made BREEAM a mandatory mechanism for all government procurement in the UK [22].

— LEED

The Leadership in Energy and Environmental Design was introduced by the United States Green Building Council (USGBC) in 1998 and it has five rating systems. These rating systems address the unique needs of buildings and project types; Building Design and Construction, Interior Design and Construction, Building Operations and Maintenance, Neighbourhood Development and Homes. LEED green building rating system is a voluntary standard for sustainable buildings [23]. The USGBC is made up of construction industry stakeholders including owners, contractors, architects, engineers, product manufacturers and environmental groups. In order to promote and facilitate the LEED process, there are over 50,000 LEED Accredited Professionals. According to [24], the number of buildings applying to the USGBC for green building certification has been doubling each year since its implementation. LEED is mostly used in USA, Canada, Spain, South Korea, China, Australia, Guatemala, India, Japan, Mexico, Puerto Rico, and Sri Lanka. The categories under the LEED certification are sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, innovation and design process. Gundogan [13] is of the view that compliance in the US and Europe on green building certification is more widespread because the requirements came from top down.

— Green Star

Green Star is a voluntary rating system developed by Green Building Council of Australia (GBCA) that evaluates the environmental design and construction of all Australian buildings. The GBCA launched the Green Star in 2002 with the main objective to encourage the Australian building industry to embrace sustainable building by promoting green building programs, technologies, design practices and operations [25]. New Zealand and South Africa have adapted Green Star to rate and certify green buildings [26]. Ghana has consequently adapted Green Star South Africa to certify green buildings. In as much as the Green Star rating tool is available for self—assessment of a design or project or building, one cannot claim publicly or promote a Green Star rating or use its logo without prior validation of the project's achievement through a formal assessment [25]. A project is eligible based on eligibility criteria; space use, spatial differentiation, conditional requirements and timing of certification. According to GBCA, projects that are awarded one to three stars may not be certified but those awarded with four or more stars may be certified. The categories under the Green Star are Management, Indoor Environment Quality, Energy, Transport, Water, Materials, Land-use and ecology, pollution, among other things.

— Green Star Sa-Ghana

The Ghana Green Building Council (GhGBC) launched a building rating system used to certify buildings to be "green" in Ghana. As mentioned earlier, the rating system was adapted from South Africa Green Star [27, 28]. The tool is called Green Star Sa-Ghana because South Africa exhibits some form of control over the usage of the tool. This tool though adopted from South Africa, has enabled Ghana to certify its green buildings located in Accra. The One Airport project in Accra applied Green Star S-Office v1 tool to their project and attained a four-star certification level. Ghana is only eligible to own and manage its own tool and certification process if the local Ghanaian capacity is built over time [29]. The categories used in Green Star-Sa Ghana are sustainable sites, water efficiency, energy and atmosphere, materials and resources and indoor environmental quality.

EMPIRICAL EVIDENCE OF THE BENEFITS OF GREEN BUILDING CERTIFICATION

Several studies have found empirical evidence of financial benefits for building owners. South Africa Green Building Council [30] reports that green star certified buildings in the country benefits from energy savings of between 25% and 50% in comparison with

conventional buildings. In Singapore, green buildings save approximately 10% in operating cost and green commercial buildings increase in value by 2% [31]. Zhang et al. [32] found that developers of green buildings receive favourable land prices and improved access to financing and higher sales prices. According to [33], certified buildings in the United Kingdom rent longer contracts and at a 28% rental premium. Also, in Russia, Greendale building consumes 36.5 % less energy [34]. Furthermore, in Australia, a 4 Green Star certified building could expect to experience a 2%-5% saving on the up-front capital cost [26]. Green building makes economic sense on the life cycle basis. This is due to the use of sophisticated energy conserving lighting systems and air conditioning systems with exceptional response to building and outdoor conditions [24]. Green building offers intangible benefits to occupants through improved comfort, health, productivity, amongst others.

THE NEED TO CERTIFY BUILDINGS IN GHANA

Studies have shown that green buildings have longer lifecycles, lower maintenance and operational costs, reduced energy and water bills and they can attract higher rents, experience lower turnover and have higher rates of occupant satisfaction when compared to conventional buildings [35]. In a typical office building for instance, energy represents about 30% of operating expenses which directly affects tenants and building owners [36]. Thus, the onus lies on the design, construction and operation of buildings to play an important role in energy conservation.

However, Ghana has not been actively seen in constructing and advocating for more green buildings as compared to countries like USA, UK, Canada and Australia. Ghana can only boast of three green buildings since its introduction by the Ghana Green Building Council in 2009. UK records over 115,000 certified green buildings with additional 700,000 registered for eventual certification [19], Canada records over 480 certified green buildings [11], and Australia records over 148 certified buildings [19]. A major strength of countries recording high numbers of green buildings is that they enjoy high level of support from their government. Because governments in the countries actively support green buildings by practicing them in their own buildings and encouraging the populace in any way that they can, they record high number of green buildings [35].

However, the action of the government of Ghana in terms of green building commitment needs more attention and improvement. The green building certification system which directly promotes green buildings in the country today is a voluntary compliance with standards promulgated by a private organisation [37] which is the Ghana Green Building Council (GhGBC). Green Building Councils (GBCs) and green building certification systems serve as indicators of a country's green building status and proficiency. This is evident in countries with well-established GBCs and certification systems as they are the world's most advanced green building nations compared to countries which do not have a vibrant GBCs and active certification systems [35].

THE ROLE OF GOVERNMENT OF GHANA IN THE GREEN CERTIFICATION OF BUILDINGS

Koski and Lee [38] identified governments as the most visible members of the regulated community, although they are often scrutinized for their actions. Ghana's contribution to gross domestic product is about 8.2% per annum [39]. This makes the Ghanaian construction industry very important to the economy. Green building councils are beneficiary to countries because they act as coordinators of green building efforts, run training programs and conferences, and offer wealth of information on a variety of green building topics [35]. Although Ghana Green Building Council encourages the application of green technologies as stated, this voluntary based certification system does not provide enough incentives for developers to adopt innovative green technologies. According to Landman [14], the responsibility for learning, educating, demanding and implementing more sustainable or green practices depends on the government rather than the private sector. Also, the government's involvement gives legitimacy to the efforts of environmental advocacy groups like the Ghana Green Building Council. Even the private sector presumes and expects that governments should play some role, although perhaps only to encourage and support organisations or individuals that voluntarily choose green building certification [40]. According to United Nations Environment Programme [41], it seems universally true that in most countries the solution requires active involvement of the government to create a suitable framework for green buildings. It further affirms that leaving the private sector to promote green building without any external support is in most cases not feasible. Often the barrier to green buildings is that there is insufficient support and leadership by various levels of governments [35].

The absence of active government's coordination and consistency in its policies concerning green building certification frustrates the efforts of the GhGBC in promoting this agenda. For green building to be firmly rooted in Ghana, the government would have to have an undulating partnership with the GhGBC and other stakeholders to encourage the Ghanaian populace to adopt the practice of "greening" their buildings. Government is usually the single largest owner of buildings in a country and is an opportunity to be supportive of green buildings and encourage this type of development in any way that they can [35]. Implementing green practices in their own buildings is a great way for governments to demonstrate leadership and environmental responsibility. The active presence of government in promoting green building certification reduces uncertainty related with regulations [42]. It also acts as an informative tool for firms considering certifying their buildings to be green by providing insight into what techniques are successful in reaching similar goals. Furthermore, [43] posits that governments are the proving ground for green buildings because their short-terms and worries are displaced by long-term concerns related to sustainability and climate change. By so doing, governments that choose to certify their buildings employ and create specialists in green buildings such that availability and expertise of architects, construction firms and building materials suppliers increase [38].

LESSONS FROM OTHER COUNTRIES

— Australia

In Australia, the building sector contributes to 20% and 23% annual energy consumption and greenhouse gas emissions respectively [44, 45]. In so doing, there is a major initiative in Australia to promote green building which will reduce greenhouse emissions

through the reduction of energy consumption and resource conservation [46]. The government of Australia's commitment has led to the Green Star certification of 68 government-owned building projects around Australia [46]. The support of the government towards the green building certification system was in a form of financial incentives, such as tax and funding solution, and non-financial incentives, such as green door policies and provision of green skills training [46]. In order to demonstrate the government's commitment to green building in Australia, the government agreed to design and construct by Green Building Council Australia's rating standards a 'six star' world class building to accommodate their administrative staff [46]. The Szencorp building in Australia reported energy savings of over 70% after two years of operation [26].

— **United Kingdom**

In United Kingdom, the number of organisations supporting sustainable building is very high, notable amongst them are the Construction Industry Council (CIC), the Home Builders Federation, the Royal Institute of British Architects (RIBA), the Commission for Architecture and the Built Environment (CABE) and the Chartered Institute of Building (CIOB). It also has Energy Saving Trust (ESTR) which operate many incentive programs to help people increase their home energy efficiencies and to decrease their energy consumption [35]. The UK has a press called the UK Green Building Press that publishes green building information monthly on a website in many mediums to help people create healthy and ecological homes, offices and other buildings.

— **United States**

In the US, the growth of green buildings has been increased by the city and government initiatives and the low prices of sustainable materials through the efforts of the government [20]. The government in the U.S. involves itself in promoting green building. An example is the Seattle city government legislatively adopting a policy to make their own municipal buildings green in the year 2000 [35]. In the US, the government dominantly uses the economic instrument target as its tactics in promoting green buildings. Some cities in the US that have enacted mandatory standards apply them primarily to public projects and those that use public funds. Other cities also reduce the burden of land use regulation for developers or building owners who adopt green building techniques and certify their buildings subsequently by expediting the environmental permitting process or reducing reporting requirements [47].

— **South Africa**

In South Africa, the increase in awareness of energy efficiency and global climate change has significantly impacted the construction industry in recent years [48]. Since the establishment of the Green Building Council South Africa, there have been a total of 36 certified green buildings. This demonstrates that green building certification is gaining grounds in South Africa [30, 49]. The South African Government is dedicated to reducing greenhouse gas emissions through green buildings. The government has decided to reduce greenhouse gas emissions by 34% by 2020 and 42% by 2025 [50]. The South African government adopted a National Green Building Framework to assist with its green building commitment. A key strategy was to develop green building regulations and standards [51] by enacting the SANS 10400 and Part XA of the Building Regulations to guide the design and construction of green buildings in South Africa.

DISCUSSION AND THE WAY FORWARD: THE NEED FOR POLICIES AND STRATEGIES

The role of the government can be in the form of well-established legal principles which gives both the government and the GhGBC the substantial freedom to regulate the design and building industries to achieve green building objectives [52]. The behaviour of the building sector to a greater extent is influenced by a wide range of signals from government, clients and researchers. Government policies have a special role in that they can influence the construction industry itself and the behaviour of the clients, financiers, researchers and other stakeholders [41]. The public sector constitutes a major actor in the building sector as building owners, tenants, developers and financiers. Government can cease this opportunity to influence the building sector to adopt green certification systems not only as a regulator but as an actor putting up good examples for others to follow [53]. The government can make use of economic tools including wide range of different kinds like constraining ones (taxes, fees, price levies, rebates); enabling ones (tax breaks, rebates, preferential lending opportunities), amongst others. These economic signals can create market conditions that provide quantifiable economic advantages to green buildings [54]. It is important to ensure that these economic signals are sent to the correct actors or the investors who pay the cost of the buildings. In this case, the investor is likely to prefer that the building is built according to green standards. The experiences of many developed countries show the deliberate intervention of governments in implementing and advocating for green buildings. The Ghanaian construction industry can achieve the kind of progress that has been made by green building councils in other countries if the government of Ghana certifies some of its public buildings to be green just as has been done in the developed countries. Evidence from literature shows a well-regulated green building certification system in UK, US, Australia and South African construction industries.

Moreover, the GhGBC and the government will have to deal with the challenges that arise due to green building, as identified in the studies conducted by [55] and [56]. Also, there is the challenge of inadequate database on past green building projects. The green specification database on green products and related technical standards enhance the awareness of project teams to gain access to resources necessary for green buildings. Furthermore, there must be in place a commercial database of green building products which have been independently vetted against sustainability criteria just as with the United States EcoSpecifier. In the United States for example, their EcoSpecifier is a database where green building products can be easily located. The insurance industry in New Zealand is realising the benefits of green buildings and in 2008 they launched a new suite of sustainability insurance products for use in commercial buildings [26].

CONCLUSIONS

The government has at its disposal several instruments such as regulations, taxation and pollution permit which can be used to

promote green buildings. The government should help in promoting certified green buildings by administering incentives which include financial and non-financial incentives. Financial incentives in the form of tax incentives, direct grants and rebates, which are monetary in nature, to developers and owners who meet some green requirements or who have their buildings meeting a green building certification system's recognition. This will partially pay or compensate companies and owners for the additional costs and efforts involved in certifying their buildings to be green, thereby reducing the effects of high cost which is a major barrier [58, 59]. The governments in the countries play a pivotal role in the promotion and implementation of green building strategies in their countries [13]. Also, the government of Ghana needs a national green building agenda which would stimulate nationwide interest and provide indirect guidance and support. The government should collaborate with the green building council in Ghana to educate the building design, construction, and investment industries, as well as ordinary citizens, on the benefits of building green. If the government implement green practices and strategies in their own buildings, they demonstrate that they are willing to make a commitment to improve their buildings and reduce their environmental impacts and that green buildings are both feasible and cost-effective.

The purpose of this paper was to examine the literature regarding current green building strategies and polices in Australia, United States, United Kingdom and South Africa so that recommendations can be made to enable its uptake in Ghana. Through the literature survey, the paper identified various pivotal roles that governments play in promoting green buildings in their various countries. This has assisted in identifying the policies and strategies that can be adopted by the government of Ghana to promote green buildings.

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