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THE DEVELOPMENT OF GREEN BUILDINGS IN VIETNAM: CURRENT SITUATION, CHALLENGES, AND POLICY RECOMMENDATIONS

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Abstract

Over the past five years, the green building movement in Vietnam has seen remarkable growth, with certified projects emerging rapidly across the country. During 2010–2019, only 165 buildings met green building standards, whereas the 2020–2024 period saw a sharp increase to 394 projects, bringing the total to 559 certified green buildings with a combined floor area of 13.57 million square meters - surpassing the national targets of 80 green buildings by 2025 and 150 by 2030. Despite this impressive growth, the proportion of certified green buildings remains modest relative to the country's potential, as the total certified area accounts for only a small share of the more than 100 million square meters of new construction each year. Meanwhile, greenhouse gas emissions from the construction sector remain high, posing challenges to Vietnam's commitment to achieving net-zero emissions by 2050 under COP26. This paper analyzes the theoretical foundations of green buildings, assesses the current development status in Vietnam, identifies the key challenges in implementation, and proposes several policy recommendations to promote this sector. The findings emphasize the necessity of stronger incentive policies, enhanced institutional capacity, public awareness, and the development of green materials and technologies to advance sustainable development goals.

Keywords: Green buildings, Green building development, Legal framework.

I. Introduction

In recent years, Vietnam has achieved an impressive economic growth rate, ranking among the world's high-growth economies with an annual increase of over 7% [VII]. The trend of "greening" economic development has been gaining strong momentum, reflected in key national policies such as the National Green Growth Strategy [XIII, XIV], the National Action Program on Sustainable Production and Consumption [XII], and the National Program on Economic and Efficient Use of

Energy [XI]. These strategic directions have established a legal foundation and supportive mechanisms that enable various sectors - including the construction industry - to progressively transition toward green building development.

The construction sector in Vietnam accounts for approximately 40% of total energy consumption and about 25% of annual water use [IV], placing it under increasing pressure to transform its development model. Green buildings are considered an effective solution to reduce emissions, conserve energy, and improve the quality of life for residents. However, the proportion of certified green buildings remains low compared to the country's potential. The total certified green floor area currently stands at 13.57 million square meters - representing less than 2% of the more than 100 million square meters of new construction each year [VIII]. Therefore, this study seeks to systematize the theoretical foundations, analyze the current situation, identify key challenges, and propose policy recommendations to promote the development of green buildings in Vietnam.

II. Theoretical Framework and Research Methodology

II.i. Theoretical Framework

A green building is regarded as the outcome of a construction process that carefully considers environmental impacts and the efficient use of resources throughout its entire life cycle. According to the World Green Building Council (WGBC), a green building is one that, across all stages of its life cycle-from site selection, design, construction, and operation to renovation, upgrading, and reuse-meets key criteria such as the rational and efficient use of resources, energy, water, and materials; the minimization of adverse effects on the environment and human health; the preservation of natural landscapes, ecosystems, and historical heritage; and the creation of optimal living conditions for occupants [XV].

The United States Green Building Council (USGBC) defines green buildings as a holistic concept grounded in the understanding that the built environment can exert profound, both positive and negative, impacts on the natural environment as well as on the health and well-being of the people who occupy those buildings daily. A green building, therefore, represents an ongoing effort to enhance these positive impacts while minimizing the negative ones throughout the entire life cycle of a building [VI].

Accordingly, although various definitions of green buildings exist, they generally refer to buildings that achieve high performance in planning, design, and operation through the efficient use of energy, water, materials, and structural solutions, thereby minimizing adverse environmental impacts, reducing risks to human health, and mitigating other negative effects associated with the built environment.

In Vietnam, the concept of a green building is defined in Decree No. 15/2021/NĐ-CP as a construction project that is designed, built, and operated in accordance with criteria and standards for efficient energy and resource use; ensures indoor comfort and environmental quality; and protects the external environment [X]. This definition aligns closely with international interpretations, as it emphasizes the efficient use of energy, materials, and natural resources to minimize environmental impacts while maintaining a high quality of life within the building.

II.ii. Research Methodology

This study employs a qualitative research approach through the analysis of documents and policy reports related to green buildings. The materials reviewed include government reports, academic studies published in scientific journals, and statistical data on green building projects, as well as relevant regulations issued by the Government and the Ministry of Construction. Data were collected and synthesized from reputable sources such as the General Statistics Office of Vietnam, the World Bank, the Ministry of Construction, and the Ministry of Planning and Investment, among others.

Given the qualitative nature of this study and the current limitations of publicly available disaggregated data on Vietnam's green building sector, quantitative modeling (including discounted cash flow analysis, supply-chain production functions, and diffusion modeling) is beyond the scope of this research. Where relevant, simplified illustrative frameworks are provided to support the qualitative findings.

III. Research Findings

III.i. Overview of Green Building Development in Vietnam

In Vietnam, the first certified green building was the Deutsches Haus (German House), which serves as the headquarters of the German Consulate General in Ho Chi Minh City and was completed in 2010. The building received two prestigious international green building certifications: the DGNB Gold Certification from Germany's sustainable building standard system and the LEED Platinum Certification. The number of green buildings in Vietnam has grown steadily over the past 14 years, particularly in the last five years. According to the 2024 Vietnam Green Building Market Overview Report by the EDGE certification system and the International Finance Corporation (IFC), while the 2010–2019 period recorded 165 certified green buildings, the 2020–2024 period saw 394 projects, bringing the total to 559 green buildings nationwide (Figure 1) [VIII, V]. This growth reflects a positive shift in awareness and actions among investors and building users regarding the benefits of green buildings. It also demonstrates the Government's strong commitment to achieving its Net Zero target by 2050 under COP26.

To contextualize this growth, it is useful to normalize certified green floor area relative to broader economic indicators. Vietnam's 13.57 million m² of certified green space represents approximately 0.13 m² per capita - significantly below the levels observed in Singapore (~2.5 m²) or Malaysia (~0.8 m²), indicating substantial room for growth. In terms of adoption dynamics, the increase from 165 buildings (2010–2019) to 394 buildings (2020–2024) suggests an accelerating diffusion pattern consistent with the early-to-mid growth phase of a logistic (S-curve) adoption model. However, given the short time series available (under 15 years) and the absence of project-level panel data, fitting a formal diffusion model would not yield statistically reliable parameters at this stage. The observed inflection point around 2020–2021 aligns with the introduction of VNEEP3 and Vietnam's COP26 commitments, suggesting that policy signals played a significant catalytic role.

In addition to the rapid increase in quantity (Figure 1), the structural composition of green buildings in Vietnam has also undergone a significant shift. Alongside residential, office, and commercial projects, the share of green industrial buildings has grown substantially within the total number of certified projects. In 2024, the industrial sector-including factories, warehouses, and production facilities-accounted for 56.45% of all certified green buildings, followed by green office buildings at 15.61% and green residential complexes at 14.15% [VIII, II].

At the same time, investment sources for green buildings have become more diversified. Prior to 2022, 100% of green building projects in Vietnam were financed by foreign or private capital. Since 2022, however, public funding has also been introduced. Three green building projects have been financed by the state budget: the Office Building of the Vietnam Securities Depository and Clearing Corporation, the Tay Ho Tay Primary and Secondary School Complex, and the Center for Research, Training, Application, and Technology Transfer in Green Construction. Nevertheless, the participation of the public sector and domestic investors remains limited [IX].

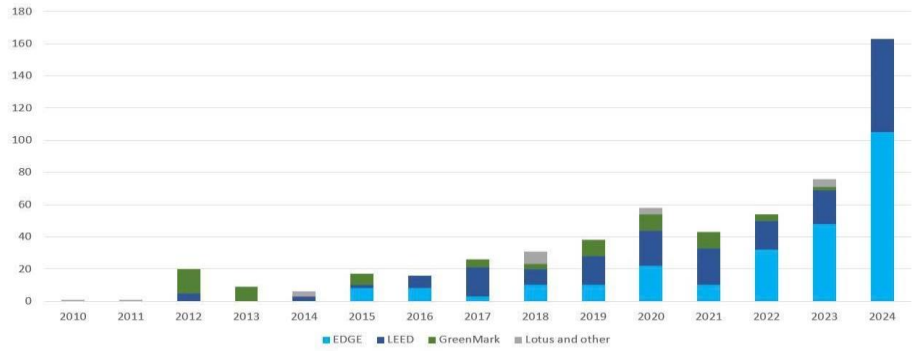

Fig. 1. Number of Green Certified Buildings per Year, 2010–2024 (Non-Accumulative)

III.ii. Challenges and Constraints in Green Building Development in Vietnam

(1) The development of green buildings in Vietnam remains largely voluntary

Regarding the Legal Framework and Policy Incentives:

The Vietnamese government has increasingly prioritized green building development, recognizing it as one of the key objectives under the National Program on Economic and Efficient Use of Energy for the period 2019–2030 (VNEEP3). Numerous policies have been issued to promote the use of renewable energy, reduce CO_2 emissions, and expand green spaces, while also encouraging real estate developers to pursue more sustainable and environmentally responsible projects [XI]. However, policy incentives for green building development remain largely declarative, lacking concrete implementation measures. Investment and project development procedures for green buildings do not currently benefit from preferential treatment compared to conventional projects[VI].

The Government of Vietnam has introduced several major policies and initiatives, including the Law on Economical and Efficient Use of Energy (2010), the Renewable

Energy Development Strategy of Vietnam to 2030 with a Vision to 2050 (2015), the Target Program on Climate Change Adaptation and Green Growth for the period 2016–2020 (2017), and the Green Growth Urban Development Plan of Vietnam to 2030 (2018). Despite these efforts, the legal framework for green buildings in Vietnam remains fragmented and lacks coherence. The concept of "green building" is mentioned only once in a sub-law document, Decree No. 15/2021/NĐ-CP-while the 2023 Law on Real Estate Business does not refer to green buildings or green real estate. Consequently, the development of green buildings remains largely voluntary, depending on investors' willingness rather than being guided or mandated by a robust legal framework. Furthermore, the dispersion of relevant provisions across multiple legal documents creates ambiguity and prolongs the process of applying green standards in practice.

Green Building Certification Systems:

As of the end of 2024, the total certified green floor area in Vietnam reached 13.57 million square meters, accredited under major certification systems such as EDGE (Excellence in Design for Greater Efficiencies), LEED (Leadership in Energy and Environmental Design), Green Mark (Green Mark Certification Scheme), and LOTUS (Figure 1). Among these, the EDGE certification accounted for the largest share-41.80% of all certified projects-with 258 developments covering 5,687,647 square meters of floor area. LEED ranked second with 208 projects, representing 39.48% of the total and encompassing 5,354,195 square meters of certified floor space. Green Mark certifications made up 14.18%, while the remaining 5% comprised LOTUS and other certification systems [VIII, II].

As shown in Figure 1, the most commonly used green building certification systems in Vietnam include EDGE (developed by the International Finance Corporation-IFC, a member of the World Bank Group), LEED (issued by the U.S. Green Building Council), Green Mark (developed by Singapore's Building and Construction Authority-BCA), and LOTUS. Among these, LOTUS is the first set of criteria and assessment tools specifically developed for the Vietnamese market. It was introduced in 2010 by the Vietnam Green Building Council (VGBC) to reflect the particular characteristics of the domestic construction sector and the country's climatic conditions. The LOTUS certification system is applied voluntarily in Vietnam, and certification for projects registered under VGBC's green building standards is provided as a paid service.

Thus, the Government of Vietnam has not yet issued a unified set of green building assessment criteria tailored to the country's specific conditions and characteristics. The development of green buildings remains primarily encouraged rather than mandated. While the diversity of certification systems reflects a multidimensional effort to adopt both international and domestic standards, it also creates confusion among investors, who must compare, select, and allocate resources to meet varying and sometimes overlapping certification requirements.

(2) High Initial Investment Costs and Limited Access to Green Finance

The construction cost of green buildings in Vietnam is estimated to be 5–15% higher than that of conventional buildings, which often discourages investors. The additional

expenses required to achieve basic green building certification primarily arise from increased construction, equipment, and consultancy costs. These costs also depend on several factors, including the investor's financial capacity, the expertise of design and cost-estimation consultants, and the availability of materials and equipment in the local market [IV]. For projects certified under the EDGE system, incremental costs typically range from 2% to 3% compared to standard buildings, whereas for LEED certification, the additional cost may reach 1.5%–8%. This not only raises the total initial investment but also extends the payback period, as operational cost savings, although potentially reaching 20%–30% annually-generate returns primarily in the medium to long term. On average, the payback period for green building projects in Vietnam is estimated at 1.5 to 6 years, depending on the project's scale and type, while conventional projects tend to recover investment faster due to their lower upfront costs [III].

A formal discounted cash flow (DCF) analysis at the individual project level is beyond the scope of this study, as it would require project-specific data on financing terms, energy tariffs, and occupancy rates that are not publicly available in Vietnam. However, the general investment logic can be illustrated through a simplified NPV framework. Assuming a discount rate of 8% (approximating Vietnam's average commercial lending rate), incremental green construction costs of 10%, and annual operational savings of 20–25%, the net present value of a typical green office building turns positive within 4–7 years, consistent with the 1.5–6 year payback range reported in the literature. The key sensitivity drivers are energy price dynamics and the availability of preferential green finance, both of which remain underdeveloped in Vietnam's current policy environment.

Table 1: Simplified NPV Scenario Analysis for Green Building Investments in Vietnam

Scenario	Additional upfront cost	Annual savings	Discount rate	Estimated NPV breakeven
Optimistic (EDGE cert.)	+3%	25%	6%	~3 years
Base case	+10%	20%	8%	~5 years
Pessimistic (LEED cert.)	+15%	15%	10%	~8 years

Existing green building projects in Vietnam continue to face significant challenges in mobilizing financial resources. Advanced financial instruments-such as green bonds and sustainable finance funds-have not yet been widely implemented, and their scale and product structures remain limited, falling short of meeting the capital needs of green projects. Many commercial banks currently provide only modest interest rate reductions for green loans, without offering additional mechanisms such as guarantees or discounts for projects that obtain green certification. At the same time, the legal framework governing green bonds is still under development, resulting in high issuance costs and stringent transparency requirements aligned with international standards, which pose considerable difficulties for domestic enterprises.

(3) Lack of Green Material and Technology Markets and Specialized Human Resources

The construction industry not only generates a high volume of CO_2 emissions but also relies heavily on non-renewable resources to produce materials that are often harmful to the environment. The adoption of green and sustainable materials is therefore essential. However, the domestic supply of green materials remains limited, with underdeveloped supply chains and a lack of sustainable local production. Many environmentally friendly building materials and energy-efficient devices still have to be imported at high costs. Material recycling has yet to receive adequate attention. Moreover, there is currently no standardized framework governing the production and use of green materials in construction, and policy incentives for the manufacturing, distribution, and utilization of products certified with the Vietnam Green Label or classified as green materials remain insufficient [IV].

While a full supply-chain modeling using production functions falls outside the scope of this qualitative study due to the absence of disaggregated production and cost data in Vietnam's green materials sector, the key structural constraints can be outlined as follows. Domestic production of green materials depends on three main input factors: capital (K) - limited local manufacturing capacity; labor (L) - shortage of qualified specialists; and technology (T) - low R&D investment and high import dependence. Current estimates suggest that a significant share of energy-efficient equipment and certified green materials is imported, primarily from China, Japan, and South Korea, making supply highly price-elastic with respect to exchange rate fluctuations and trade policy. Targeted subsidies for domestic producers and import duty reductions on green equipment would therefore be the most effective policy levers at the current stage of market development.

Human resources across all stages, from the production of green materials to project consulting, design, construction, and commissioning of green buildings, remain insufficient to meet market demand. The number of engineers and architects with expertise in green technologies is still limited, and related training programs are not yet widespread. There is also a shortage of specialists in green building design, construction, and operation, as well as a lack of consulting firms with internationally recognized qualifications and competencies in certification systems such as LEED, EDGE, and LOTUS.

(4) Limited Awareness of Green Buildings

Investors, contractors, architects, and even end users still have an incomplete understanding of the concept, long-term benefits, and technical requirements of green buildings. Common misconceptions persist, such as the belief that “green buildings are more expensive” or that they simply “mean having more greenery”**.**

Many investors and professionals continue to conflate three distinct types of projects: green buildings, resource-efficient buildings, and energy-efficient buildings. While all three are environmentally friendly, their levels of contribution to society and the environment differ significantly. Consequently, many reports and assessments in Vietnam still treat these categories as equivalent, leading to ambiguity in the statistics on green buildings [IV]. Furthermore, documentation and technical references on green

buildings in Vietnam remain limited; most available materials originate from Europe or North America, where climatic conditions differ substantially from those in Vietnam.

III.iii. Potential for Green Building Development in Vietnam

Vietnam is among the countries most vulnerable to climate change over the next 30 years. According to a 2009 World Bank projection, a one-meter rise in sea level would result in the loss of 12% of Vietnam's land area, currently home to approximately 23% of its population. At the same time, Vietnam has been one of Asia's fastest-growing economies over the past two decades, with an average annual GDP growth rate of 7.5%. Over the last ten years, the construction sector has grown at an average rate of 12% per year, while the rate of urbanization has reached 3.4% annually and is projected to approach 50% by 2025. During the same period, energy consumption has risen even faster than GDP, with an average annual increase of 14% [VIII].

At the same time, greenhouse gas emissions from the construction sector remain high. Between 2014 and 2022, emissions from building material production increased from 60.33 million tons to 95.95 million tons, while emissions from electricity consumption in buildings rose from 38.01 million tons to 61.72 million tons [IV].

IV. Policy Recommendations for Promoting Green Building Development in Vietnam

Green building development in Vietnam has achieved notable progress but remains disproportionate to the country's potential. To further stimulate this market, the authors propose the following recommendations:

(1) State policies and legal frameworks play a crucial role in guiding and accelerating the development of green buildings.

Specific incentive and support policies should be established for investors involved in the construction and development of green buildings. Green building projects should be recognized as eligible for investment incentives under the Law on Investment and other relevant legal provisions. Regarding investment and construction permitting procedures, special mechanisms should be introduced to attract and encourage greater participation from investors in green building projects.

The Ministry of Construction should develop and issue detailed guidelines on the criteria, procedures, and certification processes for green buildings, while also establishing mandatory requirements for the application of green criteria in public investment projects and large-scale construction developments.

Favorable and more specific conditions should be created for organizations and individuals engaged in research, development, and application of science and technology, as well as for investment in the production of environmentally friendly and energy-efficient building materials.

In addition, the Government should develop a unified set of criteria to identify projects eligible for green credit. At the same time, the State Bank of Vietnam should issue specific guidelines on green finance, including preferential measures related to interest

rates, taxation, and loan terms, in order to encourage financial institutions to expand their lending portfolios to include environmentally friendly projects.

(2) Strengthen communication efforts on the benefits of green finance to help organizations and individuals gain a clearer understanding of the opportunities to access preferential funding and the positive impacts of green finance on both the environment and the economy. Alongside raising awareness, it is essential to develop a supportive ecosystem for green credit, thereby creating an enabling environment for businesses and individuals to access green capital. This can be achieved through the establishment of advisory and support centers for enterprises in the field of green finance, which would provide information on relevant policies, loan procedures, and green building evaluation criteria. These centers could also serve as intermediaries between businesses and financial institutions, thereby enhancing access to capital for sustainable projects [I].

(3) To promote the widespread adoption and use of green materials, it is essential to develop comprehensive criteria for green labeling and certification, as well as to establish and refine standards and benchmarks governing the production and use of green materials in construction. Vietnam possesses abundant natural resources, such as wood, bamboo, and rice straw, which can be utilized to develop renewable and eco-friendly building materials. Surveys have shown that materials made from straw, bamboo, or natural wood can serve as viable substitutes for conventional construction materials. Moreover, as climate change intensifies and consumers become increasingly concerned about environmental quality and living standards, the use of green materials in residential and public construction projects is expected to become increasingly popular.

(4) Promoting Awareness, Training, and Capacity Building Among Stakeholders

The target groups for training should include government officials responsible for construction management at the local level, project developers, building owners and operators, engineers, architects, and consultants involved in project preparation, design, construction, and facility management. Furthermore, green building topics should be integrated into university curricula in construction and architecture disciplines to equip future professionals with the knowledge and competencies required for sustainable building practices.

Stronger and more comprehensive communication efforts are needed, adopting a multi-level and in-depth approach to help investors and the public better understand the long-term value of green buildings, thereby fostering a shift in market perception and awareness.

V. Conclusion

The development of green buildings is an inevitable trend that plays a vital role in achieving Vietnam's sustainable development goals and its Net Zero commitment by 2050. However, to foster robust growth in this sector, coordinated efforts among the government, businesses, professionals, and the community are essential. Key drivers for advancement include the improvement of the legal and policy framework, the

establishment of incentive mechanisms, the development of human and financial resources, the expansion of the green materials market, and the enhancement of public awareness. This paper provides a comprehensive assessment of the current state of green building development in Vietnam, identifies the key challenges and potential opportunities, and proposes policy recommendations to promote the sustainable growth of the green building sector.

Conflict of Interest:

The authors declare that there is no conflict of interest regarding this article.

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