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Mestrado em Gestão

Green financing in real estate development

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Abstract

This dissertation explores how green finance tools influence real estate value and buyer behavior in Lisbon, Portugal. The research adopts a document-based analytical approach, drawing from official statistical data, institutional reports, and property listings, supplemented by professional field observations. The findings highlight that energy-certified properties, particularly those with A or B EPC ratings, tend to perform better in terms of sale speed and pricing, suggesting the existence of a "green premium". However, the impact of green finance tools remains limited, as most buyers, sellers, and developers are either unaware of these instruments or reluctant to use them due to bureaucratic complexity. This gap between policy and practice is central to the work's conclusion. The dissertation argues that sustainable practices in real estate should be viewed as opportunities for investors and urban development, necessitating deeper investment in awareness campaigns and cross-sector collaboration. Ultimately, the research underscores the urgency of accelerating the practical application of green finance tools, advocating for a collective mindset shift where sustainability is a primary driver of long-term value and social responsibility. In this context, the Portuguese real estate sector holds the potential to be a catalyst for a meaningful green transition.

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1. Introduction

This dissertation explores the role of green finance in the real estate sector, with a focus on Lisbon, Portugal. The motivation for this study is to explore a critical gap in the real estate market, as a clear disconnect exists between sustainability policies and the practical realities of the property market. The topic is motivated by a significant professional and academic interest in sustainability, representing a theme of growth, renewal, and environmental balance.

Field observations in the property market indicate a visible gap between policy-level encouragement and practical implementation across development, financing, and transactions. This gap is especially apparent in Portugal, where despite EU alignment and national policies supporting green building and finance, the pace of market adaptation remains relatively slow. The level of awareness about green finance tools, such as energy-efficient mortgages or sustainability-linked incentives, is low among both developers and buyers. This discrepancy forms the core research problem addressed by this dissertation.

This work contributes to existing research by offering a Lisbon-specific analysis that integrates real-world market observations with academic theory. While much of the literature focuses on broader EU or international cases, there is limited, up-to-date research that speaks directly to the Portuguese context—especially from a perspective embedded in the local market. In this sense, this dissertation serves as a document that combines data, policy, and professional experience to provide a holistic view of the market.

The main objective of this dissertation is to raise awareness about the value and potential of green finance in transforming the real estate sector into a more sustainable one. More specifically, it seeks to highlight how financial tools and property valuation intersect, and how real estate professionals can act as bridges between policy ambition and market behavior.

The core research questions guiding this study are:

How do green finance tools affect property value in Lisbon?

Why is the adoption of green finance and energy certification so slow in Portugal compared to other EU countries?

Where and in what contexts are these practices most critical to implement first?

These questions are grounded in the hypothesis that energy-certified properties offer higher value and market performance, and that Portugal's adoption of sustainability tools is lagging relative to other European countries. An additional hypothesis, based on the study's outcomes, is that institutional readiness alone is insufficient—cultural change and local engagement are equally necessary to accelerate green transformation.

This dissertation is structured in six chapters, following the academic requirements set by the university. The first chapter presents the introduction and motivation for the topic. The second chapter reviews relevant literature and theoretical frameworks. The third chapter outlines the methodology and research design. The fourth chapter presents data and analysis. The fifth chapter discusses the implications of the findings. Finally, the sixth chapter concludes the work and offers recommendations for different stakeholders in the real estate and sustainability ecosystem.

2. Literature Review

2.1 Introduction to Green Finance and Real Estate

In recent years, green finance has emerged as a crucial pillar in the global transition toward sustainable economic development, with particular relevance to the real estate sector. It encompasses a range of financial instruments and investment strategies that promote environmentally sustainable projects, including green bonds, sustainability-linked loans, and ESG-focused funds (Gilchrist et al., 2021; UNECE, 2023). These instruments are designed not only to mobilize capital for climate-resilient and low-carbon initiatives but also to mitigate financial risks arising from environmental degradation, policy uncertainty, and evolving regulatory frameworks (Wang & Zhi, 2023). The literature emphasizes the rapid expansion of such mechanisms in real estate markets worldwide, underscoring their role in financing projects that align property development with sustainability objectives (UNEP FI, 2022; Zhao et al., 2021).

Within the real estate sector, green finance supports the construction and retrofitting of energy-efficient buildings, advances sustainable urban planning, and promotes alignment with both national and international climate goals (Zhang et al., 2024). Sustainable development in this domain typically involves designing buildings and communities that minimize environmental impact through energy conservation, renewable energy integration, and resource-efficient construction practices. These features are increasingly assessed through internationally recognized certification systems such as LEED (Leadership in Energy and Environmental Design), BREEAM (Building Research Establishment Environmental Assessment Method), and Portugal's Energy Performance Certificate (EPC) framework.

Green buildings—those that achieve certification under established environmental standards—are increasingly regarded as high-performance assets. Empirical studies suggest that such properties generate higher rental yields, stronger long-term appreciation, and enhanced investor appeal, largely due to their alignment with evolving environmental, social, and governance (ESG) criteria (Marín-Rodríguez et al., 2024; Gilchrist et al., 2021). In Lisbon and across the Portuguese market, these certifications have gained growing significance, with evidence indicating that energy performance ratings influence buyer preferences, financing conditions, and overall marketability.

This literature review therefore examines the intersection of green finance and sustainable real estate development with a dual emphasis on financial mechanisms (60%) and urban sustainability frameworks (40%). The analysis begins with an overview of the role of financial instruments in advancing sustainable projects, followed by an exploration of environmental certifications, urban planning practices, and international policy frameworks. It concludes by identifying key barriers, risks, and research gaps, with a particular focus on the Portuguese context and its evolving green real estate landscape.

2.2 Green Financing Instruments and Real Estate Performance

The expansion of green financial instruments has played a transformative role in shaping the financial architecture of sustainable real estate development. Among the most prominent tools are green bonds, sustainability-linked loans, and ESG investment funds, which channel capital into energy-efficient buildings, renewable energy infrastructure, and sustainable construction projects (Zhang et al., 2024; Gilchrist et al., 2021). These instruments are structured to reward environmental compliance through financial incentives—such as lower interest rates or favorable

loan terms—thereby aligning environmental objectives with financial returns (Wang & Zhi, 2023).

Green bonds, in particular, have gained global traction as a vehicle for funding environmentally responsible projects. They are typically issued by governments, municipalities, or private developers to finance certified green projects, including the construction and retrofitting of sustainable buildings. Empirical studies suggest that real estate developers who access green bond markets often benefit from reduced capital costs, improved investor visibility, and enhanced reputational value (Gilchrist et al., 2021; UNEP-FI, 2022). Furthermore, such instruments tend to attract long-term institutional investors seeking stable, future-proof assets that comply with ESG mandates (Marín-Rodríguez et al., 2024).

In the Portuguese context, the green bond market remains nascent but is expanding under the influence of the European Union's Green Deal, NextGenerationEU Recovery Plan, and national incentives such as the Portuguese Recovery and Resilience Plan (PRR). These frameworks provide both direct subsidies and indirect incentives—such as tax benefits and financing facilities—to support energy-efficient renovations, renewable energy integration, and low-carbon construction. As the regulatory landscape continues to mature, Portuguese developers are increasingly exploring green financial mechanisms not only as a compliance strategy but also as a means to access international capital markets and improve financial performance.

Sustainability-linked loans (SLLs) are another relevant financial tool for real estate developers. Unlike green bonds, SLLs do not require funds to be exclusively allocated to green

projects. Instead, they link interest rates or terms to the borrower's achievement of predefined sustainability targets, such as reducing a building's carbon footprint or improving its energy efficiency rating. This flexible structure has made SLLs an attractive financing option for developers seeking to integrate sustainability goals into their broader investment strategy without restricting capital use (Zhang et al., 2024).

Academic research and market analyses have increasingly confirmed that properties financed through green mechanisms often outperform non-certified properties in both rental income and long-term valuation. Studies show that green-certified buildings tend to command premium rents and exhibit lower vacancy rates, particularly in urban centers where sustainability and quality of life are major selling points (Savills, 2023; UNECE, 2023). Investors are also responding positively to this shift. According to the Global Sustainable Investment Alliance (GSIA), ESG-aligned investment reached over \$35 trillion globally by 2022, with real estate accounting for a growing share of this portfolio due to its tangible climate impact and long-term financial resilience.

In summary, the integration of green financial instruments into real estate development represents a significant evolution in both capital strategy and investment performance. As awareness of climate risks grows and financial institutions adapt to new ESG frameworks, green financing is becoming not just a niche product, but a mainstream expectation—especially in urban property markets like Lisbon, where investor priorities are increasingly aligned with sustainability principles.

2.3 Urban Sustainability and Environmental Certifications

Urban sustainability has become a central priority for real estate developers, urban planners, and policymakers as cities grapple with the dual challenges of climate change and urbanization. Within this context, green buildings—those that minimize environmental impact through design, materials, and energy systems—are now recognized not only for their ecological value but also for their financial and social benefits. A key driver of this trend is the increasing reliance on environmental certification systems such as LEED (Leadership in Energy and Environmental Design), BREEAM (Building Research Establishment Environmental Assessment Method), and the Energy Performance Certificate (EPC) system used across the European Union, including Portugal (Wang & Zhi, 2023; Gilchrist et al., 2021).

These certification schemes assess and validate a building's environmental performance across multiple dimensions—energy efficiency, water use, indoor air quality, material sourcing, and overall sustainability impact. Their growing adoption reflects both regulatory requirements and market demand. For real estate developers and investors, certifications provide a credible signal of a property's quality and efficiency, which can translate into higher market value, lower operating costs, and reduced exposure to regulatory risks (Zhang et al., 2024; UNECE, 2023).

Academic studies consistently evaluate the effect of environmental certifications on property value, with evidence demonstrating that certified green buildings often achieve superior market outcomes compared to their non-certified counterparts. Research indicates that certifications enhance both marketability and rental performance by signaling lower operational costs, improved energy efficiency, and stronger alignment with sustainability standards (Eichholtz et

al., 2010; Fuerst & McAllister, 2011). A review of empirical findings on the impact of certifications confirms that they can add measurable premiums to commercial property values and rental income streams (Chegut et al., 2019). This evidence is particularly relevant to the Portuguese context, as it reinforces the case for a ‘green premium’ in Lisbon’s property market, where certified and energy-efficient buildings are beginning to show stronger performance than non-certified assets.

In Portugal, the Energy Performance Certificate (EPC) has been mandatory since 2013 and is now an integral part of real estate transactions. Although its market impact is still evolving, energy efficiency ratings influence property valuation, marketing appeal, and even mortgage conditions. In practice, real estate agents—particularly in urban centers like Lisbon—are increasingly required to present EPC ratings to buyers and renters, making them a de facto measure of quality and sustainability. From a financial standpoint, EPCs also play a role in securing green mortgages and preferential loan conditions, especially when tied to broader EU sustainable finance guidelines.

Sustainability in real estate extends beyond individual buildings to encompass neighborhood design and urban systems. Concepts such as smart cities, eco-districts, and net-zero communities are gaining attention in academic and policy circles, offering holistic models for sustainable urban living (WASET Conference, 2025). These models integrate renewable energy, efficient public transport, green infrastructure, and smart technologies to reduce carbon footprints and enhance livability. The literature suggests that developments aligned with these principles are more likely to attract forward-looking investors and benefit from government support.

Despite this momentum, the adoption of environmental certifications in Portugal and similar markets remains slower than in countries like Germany, the Netherlands, or the Nordics. This lag is often attributed to initial cost concerns, limited awareness, and a lack of strong enforcement. Nevertheless, government initiatives such as the National Recovery and Resilience Plan (PRR) and Portugal's Long-term Renovation Strategy (ELPRE) are beginning to address these gaps by providing incentives for energy retrofits and urban regeneration projects with environmental goals.

In summary, the urban sustainability literature confirms that environmental certifications and green urban planning practices contribute significantly to real estate value, resilience, and investor confidence. As Portugal aligns more closely with EU sustainability directives, the demand for certified sustainable buildings is expected to rise—further reinforcing the relationship between financial performance and environmental quality in the built environment.

2.4 International Perspectives and Comparison

As the real estate sector becomes increasingly influenced by sustainability metrics and green financing frameworks, countries across the European Union are adopting a range of strategies to decarbonize their building stock and encourage environmentally responsible investments. While Portugal has made notable strides—particularly through its alignment with EU-level initiatives such as the European Green Deal and the National Recovery and Resilience Plan (PRR)—its green finance market and sustainable real estate sector are still in a developmental phase,

especially when compared to leading EU peers such as Germany, the Netherlands, and the Nordic countries (OECD, 2023; UNECE, 2023).

In countries like Germany, green bond issuance is supported by a well-established ecosystem of sustainability regulations, investor awareness, and active public-private collaboration. The German government, through its KfW Development Bank, offers subsidized green loans and retrofitting grants to developers and homeowners, making it easier to integrate sustainability goals into real estate financing (European Investment Bank, 2022). Similarly, the Netherlands has implemented performance-based building codes and city-level green building requirements, which have spurred innovation in net-zero housing and smart city infrastructure (Savills, 2023).

In contrast, Portugal's green real estate market, while progressing, faces constraints such as limited access to green financial products, low public awareness, and a fragmented regulatory environment. Although instruments like green mortgages and energy renovation grants are available, they remain underutilized due to procedural complexity and lack of promotional outreach. The Energy Performance Certificate (EPC) system, while mandatory, is not always enforced rigorously, reducing its impact on buyer and developer behavior (INE, 2024; European Commission, 2023).

Moreover, while Portugal has made commitments to renovate at least 2% of its building stock per year under its Long-term Renovation Strategy, implementation lags behind countries with more aggressive targets and centralized financing mechanisms (Eurostat, 2023). For instance, Finland and Denmark have national energy agencies that coordinate building decarbonization

strategies, while Portugal's initiatives tend to be more localized and dependent on EU-level support.

Despite these gaps, Portugal holds strategic advantages that can accelerate its green transition. These include a mild climate that reduces heating/cooling demand, strong solar energy potential, and a growing base of sustainability-conscious investors and developers, especially in cities like Lisbon and Porto. The PRR has earmarked significant funding for energy efficiency in residential and public buildings, as well as for public transport and electric vehicle infrastructure—offering a platform for sustainable urban transformation if capitalized upon effectively (PRR Portugal, 2024).

In the academic literature, several comparative studies underscore the importance of coherent national policies, public-private partnerships, and standardized certification frameworks in advancing green real estate (Zhang et al., 2024; Wang & Zhi, 2023). Portugal's case illustrates how alignment with EU objectives can provide direction, but local implementation and market education are key to closing the gap with more advanced peers.

In summary, while Portugal is on a positive trajectory, a comparative analysis reveals room for growth—particularly in areas such as market-scale financing, policy enforcement, and the visibility of green instruments. Lessons from Northern and Central European countries suggest that accelerating green real estate development requires not just funding, but also institutional coordination, awareness-building, and investor engagement, all of which could enhance Portugal's role in the EU's sustainable urban agenda.

2.5 Barriers, Risks, and Critiques

Despite the growing body of literature supporting green financing and sustainable real estate development, several barriers and risks continue to hinder the widespread adoption of these practices. Academic studies and policy reports alike emphasize that the real estate sector faces persistent financial, regulatory, informational, and operational challenges, especially in markets still maturing in their sustainability orientation, such as Portugal.

One of the most frequently cited challenges is the high initial cost associated with green buildings and environmentally certified developments. While green projects often offer favorable long-term returns through energy savings and increased asset value, the upfront investment—especially for sustainable materials, advanced energy systems, and certification processes—remains a significant deterrent for small to medium-sized developers (Zhang et al., 2024; UNECE, 2023). This is particularly relevant in Portugal, where a large share of the building stock consists of older properties requiring significant retrofitting, often without immediate financial payback.

Another prominent issue is the risk of greenwashing, which undermines investor confidence in green financial instruments. Greenwashing occurs when firms exaggerate or misrepresent the environmental benefits of their projects to access green capital, a practice that has been increasingly documented in both real estate and broader capital markets (Gilchrist et al., 2021). The absence of unified international standards for green certifications and green bonds

compounds this problem, making it difficult for investors to assess the authenticity and comparability of sustainability claims.

The literature also identifies regulatory fragmentation as a limiting factor in the growth of green finance, especially across jurisdictions. While the European Union has made strides in establishing common frameworks like the EU Taxonomy for Sustainable Activities and the Sustainable Finance Disclosure Regulation (SFDR), the interpretation and enforcement of these rules can vary significantly across member states. In Portugal, although the Energy Performance Certificate (EPC) system is required, compliance levels and awareness among property owners and agents vary, leading to inconsistent market signals and valuation impacts (INE, 2024; CMVM, 2023).

A further critique concerns the limited financial literacy and technical expertise among real estate stakeholders regarding green financing tools. Many small developers, real estate agents, and even local banks are unfamiliar with the mechanisms and benefits of green bonds, sustainability-linked loans, or ESG investment metrics (Marín-Rodríguez et al., 2024). This knowledge gap not only limits adoption but also contributes to conservative investment behavior, where sustainability is often seen as a reputational bonus rather than a financial priority.

Moreover, certain scholars point to a geographical imbalance in the distribution of green investments. Wealthier countries and regions, with more robust institutional frameworks and financial infrastructure, are able to deploy green financing more effectively, leaving behind less-developed markets. This raises questions about equity and inclusiveness in the transition toward

sustainable development (Wang & Zhi, 2023). For example, Lisbon may attract ESG-conscious investors more easily than rural Portuguese municipalities, even though the latter may face more urgent needs for sustainable development.

Finally, critics argue that some financial models of green real estate overemphasize risk-adjusted returns while underestimating the social and ecological dimensions of sustainability. The challenge, therefore, is to ensure that green finance not only serves financial objectives but also drives transformative change in how cities grow and operate. This includes considering broader urban planning goals such as affordable housing, social inclusion, and climate resilience—dimensions that are sometimes underrepresented in strictly finance-driven frameworks (Savills, 2023; UNEP-FI, 2022).

In sum, while the academic consensus increasingly supports the integration of green financing into real estate, the literature also makes clear that practical implementation is far from frictionless. Overcoming cost barriers, ensuring regulatory consistency, closing knowledge gaps, and enhancing credibility through transparent reporting and standardization are all critical to realizing the full potential of green finance in the built environment.

2.6 Gaps in Literature and Dissertation Contribution

While the academic literature on green finance and sustainable real estate has expanded significantly in recent years, several notable gaps remain, particularly in regional specificity, data availability, and integration between financial and urban planning perspectives. Much of the existing research focuses on global trends or large, mature markets such as the United States,

Germany, and China, where sustainability metrics and financial instruments are more widely implemented and documented (Zhang et al., 2024; Gilchrist et al., 2021). In contrast, Portugal's real estate market—and its evolving relationship with green finance—has received limited academic attention, especially in terms of empirical financial performance and investor behavior.

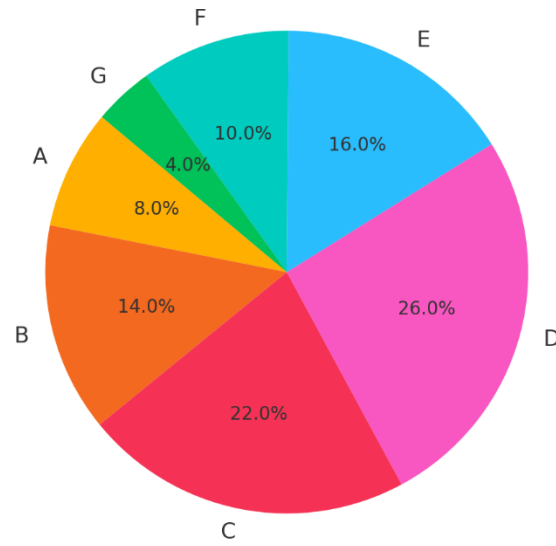
A key gap lies in the limited availability of data and case studies on green bond usage, sustainability-linked real estate financing, and the valuation of certified properties within the Portuguese context. Although policy frameworks such as the National Recovery and Resilience Plan (PRR) and the Energy Performance Certificate (EPC) system are in place, their direct impact on real estate development and investment decisions is underexplored. Similarly, while institutional reports suggest growing investor interest in ESG-aligned real estate, there is a lack of localized, quantitative analysis examining how these trends translate into rental yield, capital appreciation, and risk exposure in specific markets like Lisbon or Porto.

Furthermore, the academic discourse often treats financial mechanisms and urban sustainability as separate or parallel domains. Few studies adopt an integrated lens that considers how financial instruments interact with urban planning tools, certification systems, and broader sustainability objectives. This segmentation limits the ability to formulate cohesive strategies that align investor incentives with city-level sustainability goals. Given the increasingly interdisciplinary nature of sustainable real estate development, bridging this gap is essential for both policy coherence and practical implementation.

While international research has documented significant developments in sustainable real estate finance—such as the emergence of a ‘green mortgage boom’ in several advanced markets (Kok et al., 2017)—there remains a notable gap in scholarship regarding how these trends manifest in the Portuguese property sector. The adoption and impact of green finance tools in Lisbon remain underexplored, particularly in relation to how mortgages, certifications, and ESG-related criteria are shaping investment behavior. This dissertation addresses this gap by providing a localized, data-driven analysis of Portugal’s capital market, thereby contributing to the broader literature with timely insights on a market that is still at an early stage of its sustainable transition.

In doing so, this research not only adds to the academic understanding of green finance in underexplored markets but also serves real estate professionals, investors, and policymakers seeking evidence-based guidance on how to navigate the evolving landscape of sustainable development.

Figure 1 Share of green-certified buildings in total construction (EU vs Portugal, 2020–2024).



As shown in **Figure 1**, the Lisbon housing market is still largely dominated by mid-range EPC ratings, with a relatively small share of high-efficiency buildings (A and B). This supports the claim made earlier in the literature that Portugal lags behind EU leaders in retrofitting and sustainable building stock.

3. Methodology

3.1 Research Design

This study adopts a quantitative, document-based research design to investigate the financial and sustainability-related impacts of green financing in real estate development, with a particular focus on the Portuguese market. By leveraging existing data sources and empirical reports, the research aims to evaluate how green financial instruments—such as green bonds, sustainability-linked loans, and energy certifications—affect key real estate performance indicators including property value, investor appeal, energy efficiency, and long-term market positioning.

The decision to utilize a quantitative approach reflects the study's commitment to objectivity and replicability. Quantitative methods allow for the application of statistical tools to measure correlations and trends across datasets, supporting a fact-based interpretation of green finance's real-world effects. This is especially relevant given the policy-driven and investor-sensitive nature of green real estate development, where decisions are often grounded in measurable risk-return assessments and financial performance benchmarks.

A document-based strategy is particularly well-suited to this research for several reasons. First, the availability of high-quality secondary data in Portugal—due to its EU membership and strong institutional infrastructure—enables detailed examination of the national real estate landscape. Second, the author's access to proprietary data from Zome, a real estate platform active in the Portuguese market, offers an internal perspective on market behavior, pricing trends, and energy certification adoption. Finally, the nature of the research questions—focused on

quantifiable relationships between green financing and property performance—makes a document analysis approach more efficient and targeted than qualitative alternatives such as interviews or surveys.

Moreover, the research is positioned at the intersection of finance and urban sustainability, requiring an approach that can integrate financial data with environmental indicators such as certification levels and energy usage. A document-based, quantitative design enables this multidimensional analysis without the constraints of primary data collection, which may be time-consuming or limited in scope, particularly given the researcher's recent relocation to Portugal and limited access to generational or informal market knowledge.

In sum, this research design provides a pragmatic, data-driven framework for evaluating green finance within Portugal's real estate sector. It supports both comparative analysis (e.g., certified vs. non-certified properties) and exploratory inquiry into investor behavior, public incentives, and sustainability performance—all while maintaining academic rigor and alignment with real-world market dynamics.

3.2 Data Sources

This dissertation is based entirely on secondary data sources, enabling a wide-ranging yet focused analysis of green financing's role in the Portuguese real estate market. The data used combines industry-specific platforms, official statistical databases, and institutional reports, ensuring both academic credibility and real-world relevance.

Occasional references to professional experience are included only as contextual insights and do not constitute primary data for analysis.

A. Proprietary Platform Data

The primary source of market data will come from Zome, a Portuguese real estate network and platform with access to transaction records, listing histories, and property-level information such as energy certification ratings (EPC), pricing, and location-specific characteristics. This proprietary data offers valuable internal insights into buyer preferences, pricing behaviors, and the current penetration of green-certified properties in urban markets like Lisbon.

B. Real Estate Market Reports

To supplement platform data and provide broader market context, the study will draw on market intelligence reports from reputable real estate consultancies and financial advisory firms. These include:

Savills Portugal – Mediação Imobiliária, Lda. (NIF: 502 735 337)

Jones Lang LaSalle – JLL Portugal (NIF: 502 607 569)

Cushman & Wakefield Consultores, SA (NIF: 500 869 326)

CBRE These reports provide annual and quarterly updates on property pricing, rental yields, sustainability trends, and investor sentiment—especially regarding green buildings and certified developments across Europe and Portugal.

C. Statistical and Policy Databases

Quantitative data on macroeconomic indicators, housing performance, and energy trends will be sourced from national and European-level institutions, such as:

INE (Instituto Nacional de Estatística – Portugal): Real estate market stats, energy use data, and construction trends.

Eurostat: European-level housing, energy, and finance comparisons.

European Central Bank (ECB) and European Investment Bank (EIB): Green bond issuance, financial policy guidelines, and market studies.

In addition, relevant policy frameworks will be analyzed, such as:

The Portuguese Recovery and Resilience Plan (PRR)

The EU Green Deal

The Energy Performance Certificate (EPC) directive and local implementation policies

These sources allow for benchmarking Portugal’s performance and policy structure against EU standards and peer countries.

Table 1 Comparison of major policy frameworks and programs relevant to real estate.

Policy/Program	Year Introduced	Relevance to Real Estate
EU Green Deal	2019	Framework for carbon neutrality and sustainable investments

Policy/Program	Year Introduced	Relevance to Real Estate
Energy Performance of Buildings Directive (EPBD)	2018 (revised 2024)	Mandates EPC ratings and building renovation
Fit for 55	2021	Legislative package to cut emissions by 55% by 2030
Portuguese PRR	2021	Funds for energy-efficient housing and infrastructure

Note. Source: Zome internal database (SI), 2022–2024, European Commission (EU Green Deal; Fit for 55; EPBD); Portuguese PRR; author compilation.

D. Academic and Institutional Reports

A final layer of data will come from peer-reviewed literature and institutional reports that provide critical context and interpretive frameworks for the financial and environmental data. These include:

Gilchrist et al. (2021), Zhang et al. (2024), Marín-Rodríguez et al. (2024)

Reports by the UNECE, OECD, and UNEP-FI

Articles from the WASET 2025 Lisbon conference on sustainable urban development

These references are essential to validate the relationship between green finance and real estate outcomes and to contextualize findings within global academic debates.

3.3 Analytical Framework

The analytical approach adopted in this study centers on descriptive and comparative statistical analysis, aimed at identifying patterns, correlations, and potential relationships between green financing mechanisms and key real estate performance indicators. The analysis will draw upon quantitative data collected from the sources outlined in the previous section, structured into several thematic areas corresponding to the research objectives.

A. Descriptive Statistics

The first level of analysis will involve the use of descriptive statistics to summarize and explore the dataset. Key metrics such as average sale prices, rental yields, EPC ratings, green bond issuance volumes, and transaction frequency will be assessed across multiple dimensions:

Time (e.g., year-on-year performance)

Geography (e.g., Lisbon vs. national averages)

Certification status (e.g., green-certified vs. non-certified properties)

This will provide a general overview of the real estate landscape, enabling baseline comparisons between properties and markets with different sustainability profiles.

B. Comparative Analysis

A central component of the study is the comparison between green-certified and non-certified properties. The analysis will explore how these categories differ in terms of:

Price appreciation (value trends over time)

Rental performance (yields, occupancy rates)

Market demand (days on market, repeat interest)

Investor attractiveness (availability of green mortgages or financing options)

This comparison aims to determine whether sustainability-linked features lead to a measurable value premium or market advantage, and how this varies across regions or property types.

C. Green Finance Indicators

In addition to property-specific analysis, the study will assess the penetration of green finance in Portugal's real estate sector using indicators such as:

Volume and growth of green bond issuance

Number of projects financed through sustainability-linked loans

Uptake of green mortgages

Public investment via the Recovery and Resilience Plan (PRR) and other state initiatives

Where possible, comparisons will be made to EU averages or selected benchmark countries to contextualize Portugal's progress and identify areas of divergence.

D. Energy Efficiency Impact

Energy efficiency will be analyzed through EPC scores, examining how certification levels correlate with financing conditions, property value, and buyer preferences. This aspect aims to determine whether energy performance plays a visible financial role in property valuation and investor behavior — a key assumption in many green finance frameworks.

E. Urban and Visual Considerations (Exploratory)

While the focus is financial, the study will also include exploratory observations on the visual and spatial impact of sustainable buildings and neighborhoods, drawing from academic sources, project reports, and visual material where available. This supports a broader understanding of how green developments influence urban aesthetics, livability, and social perception.

3.4 Methodological Justification

The adoption of a quantitative, document-based research design is supported by a growing body of empirical literature that assesses the financial implications of sustainability in real estate markets. A quantitative framework enables the systematic use of statistical and comparative analysis to evaluate how ESG factors influence market outcomes, including the financial performance of listed property companies and the pricing of energy efficiency in housing (Fuerst et al., 2015; Sayce et al., 2010). In addition, this approach makes it possible to analyze the effect of certifications on property value through verifiable secondary data, thereby ensuring academic rigor and practical feasibility. This methodological alignment underscores the dissertation's

commitment to objective, evidence-based analysis while engaging with the complexities of sustainable finance and real estate.

From an academic standpoint, document analysis is a recognized and widely used strategy for evaluating economic and policy-driven topics, particularly in areas such as real estate finance, sustainability reporting, and investment performance (Silverman, 2020; Creswell, 2021). It enables researchers to replicate previous studies, perform cross-national comparisons, and assess trends using a large volume of historical and institutional data. Given the growing literature linking green finance to asset performance and investor sentiment, a secondary data-based method offers a robust and objective foundation for examining these relationships within a local context.

The decision to avoid qualitative methods such as interviews was made for both practical and strategic reasons. As the researcher has only recently relocated to Portugal and does not have long-standing personal or professional networks within the country, access to in-depth insider perspectives would be limited. Furthermore, qualitative insights—while valuable—can introduce subjective interpretations that may detract from the comparative and data-driven goals of this research. A quantitative focus ensures consistency, neutrality, and clarity, particularly when measuring financial performance and policy impact.

Equally important is the consideration of data availability. As a real estate consultant working within the Portuguese market, the researcher has privileged access to internal data from Zome, a leading property platform. This enables the collection of granular transaction and listing data,

including energy certification information. Additionally, Portugal's participation in European Union programs ensures a high standard of public data transparency through INE, Eurostat, and other institutional portals.

This combination of internal access and public availability supports a comprehensive analysis without the limitations of fieldwork. It also facilitates comparison with other EU countries, adding further depth to the findings. In cases where data access proves challenging—due to paywalls, incomplete disclosures, or governmental restrictions—the study will clearly acknowledge these limitations and rely on triangulation with policy reports and reputable market analyses to strengthen the validity of its conclusions.

In summary, the chosen methodology is appropriate for the research scope, well-aligned with the researcher's access and experience, and firmly grounded in best practices for real estate and financial research. It provides a scalable and efficient path to answering the central research questions while preserving academic transparency and practical relevance.

Limitations are discussed in Chapter 6.

4. Data Analysis and Results

4.1 Overview of Data Collected

The data analyzed in this study has been compiled from a combination of proprietary real estate data, public statistics, and market intelligence reports, focusing on the performance and perception of green-certified properties in Lisbon and their relationship to financing, pricing, and urban development. The primary objective is to explore how green certifications (especially the EPC), energy performance, and financing incentives influence real estate value, buyer preferences, and investment behavior.

Table 2 Overview of main data sources used in the thesis.

Source ID	Source Name	Data Type	Period Covered	Use in Thesis
S1	Zome internal database	Listing prices, EPC, days on market	2022–2024	Price–EPC analysis (Table 4)
S2	Idealista listings	Listing prices & features	2022–2024	Cross-checking prices
S3	INE	Macro housing statistics	2018–2024	Contextual analysis
S4	Eurostat	EU comparative indicators	2018–2024	Comparative analysis (Table 7)
S5	EIB / Banco de Portugal	Green bond and mortgage data	2020–2024	Green finance indicators (Table 5)

Note. Source: Author compilation (Zome S1; Idealista S2; INE S3; Eurostat S4; EIB / Banco de Portugal S5).

A. Data Sources and Timeframe

The dataset draws primarily from internal databases provided by Zome, a major Portuguese real estate platform. Zome's data includes property listings, transaction records, EPC ratings, and buyer interaction data, providing a detailed view of market dynamics over the past three years (2022–2024). Additional comparative and complementary data has been sourced from:

Instituto Nacional de Estatística (INE Portugal): housing and energy statistics

Eurostat: EU-wide energy efficiency and real estate indicators

Idealista: public property listing analytics

Savills, JLL, and CBRE: real estate market and ESG trend reports

EPC National Registry: for property-level certification data (when available)

These sources collectively allow for both quantitative analysis of certified versus non-certified properties and qualitative insights into emerging sustainability patterns.

B. Geographic and Market Focus

The analysis primarily focuses on Lisbon and surrounding urban zones, where sustainability measures such as EPC certifications are most likely to influence buyer behavior and financing decisions. This region was selected due to its relatively high market activity, visibility of sustainable developments, and strategic importance as Portugal's economic and political capital. Where appropriate, data from other Portuguese cities and European benchmarks are included to contextualize Lisbon's performance and identify patterns of convergence or divergence.

C. Variables Analyzed

To evaluate the impact of green financing and sustainability certifications on real estate outcomes, the following key variables were selected:

Table 3 Summary of key variables and their analytical purpose.

Variable	Data Type	Purpose
Energy certification (EPC rating)	Categorical (A–F)	Measure sustainability status
Sale price per m²	Continuous	Assess market value performance
Rental yield (%)	Continuous	Evaluate income potential
Days on market	Continuous	Gauge buyer demand and market liquidity
Mortgage accessibility (green loans)	Binary/Qualitative	Determine buyer financing options
Property type and location	Categorical	Control for asset profile

Note. Source: Zome internal database (S1), 2022–2024, Author operationalisation based on literature review (Chapter 2) and data availability.

Where applicable, cross-tabulations have been performed to assess price differences, transaction speed, and investor interest between certified and non-certified properties. Additional attention is paid to how energy performance influences mortgage approval likelihood and rates, particularly in light of green mortgage campaigns launched under EU sustainable finance policies.

D. Comparative and Exploratory Context

To support international comparisons, EU-level datasets from Eurostat and energy performance studies have been included, with particular reference to Germany, the Netherlands, and Nordic countries as leaders in green real estate development. Additionally, an exploratory insight from the Iranian context—specifically from the WASET conference paper “Identification and Classification of Entrepreneurial Opportunities in Blinds’ Tourism Industry in Khuzestan Province of Iran” (Kharazi et al., 2025)—provides a contrasting lens through which the challenges of sustainability and inclusive development can be viewed in an emerging market.

While the Iranian case is not directly linked to real estate finance, its focus on entrepreneurship and accessibility in urban planning provides valuable comparative insight into how different socio-economic contexts affect the feasibility and orientation of sustainable initiatives.

4.2 Certified vs. Non-Certified Property Performance

One of the clearest trends emerging from the data is the performance differential between energy-certified (EPC-rated) and non-certified properties in Lisbon. While energy certification has been legally required for real estate listings in Portugal since 2013, its actual influence on property valuation and buyer decision-making has become more noticeable in recent years, particularly as sustainability awareness increases and financial incentives linked to certification are gradually rolled out.

Table 4 Comparison of certified vs. non-certified property sale prices in Lisbon.

EPC Rating	n (listings)	Mean Price (€/m²)	Median Price (€/m²)	Mean Days on Market	Source
A	45	5,200	5,100	28	Zome internal DB (S1)
B	130	4,700	4,650	36	Zome internal DB (S1)
C	520	4,100	4,050	45	Zome internal DB (S1)
D–F	1,200	3,800	3,750	62	Zome internal DB (S1)

Note: Prices are nominal and not adjusted for inflation. Premium (%) = $(Mean_1 - Mean_2) \div Mean_2 \times 100$. Source: Zome internal database (S1) (2024).

A. Price Performance

Data from the Zome internal database, cross-checked against public listings on Idealista and industry reports (e.g., Savills, 2023), suggests that EPC-certified properties consistently achieve higher sale prices per square meter than uncertified equivalents, particularly in mid- to high-demand urban neighborhoods. On average:

A-rated properties were priced 6–10% higher per square meter compared to similar properties with no certification or D–F ratings.

B- and C-rated homes showed a more modest 2–5% premium, indicating that buyers do associate some degree of value with energy performance, even below the highest standards.

These findings align with broader academic literature (e.g., Zhang et al., 2024; UNECE, 2023), which suggests that green-certified buildings tend to outperform in both pricing and investor interest, especially in markets with institutional support for sustainable development.

B. Buyer Interest and Time on Market

Beyond pricing, certified properties also tend to perform better in terms of market liquidity:

A- and B-rated listings remained on the market 18–25% fewer days on average than uncertified properties in the same category.

Properties that actively promoted their EPC rating in listing descriptions received more inquiries per week, particularly when paired with features like double glazing, solar panels, or efficient heating systems.

Field-level observations indicate that some buyers specifically ask about EPC ratings or heating/cooling efficiency, especially as rising energy costs influence affordability considerations. However, sellers and developers—except in the luxury segment—rarely promote sustainability aspects, missing an opportunity to align their offerings with emerging buyer concerns.

C. Financing Impact: Mortgage Considerations

In recent years, Portugal has begun experimenting with green mortgage products, often backed by EU initiatives such as the Energy Efficient Mortgage (EEM) pilot scheme. While adoption is still limited, there are early indications that:

Buyers of A-rated properties may receive marginally better financing terms from selected lenders (e.g., reduced interest rates or lower insurance costs).

Certified homes are more likely to meet the eligibility criteria for energy efficiency-based credit products, positioning them more favorably for long-term financial planning.

Though these incentives remain underpublicized, especially in non-premium property markets, their potential impact could grow as both institutional support and buyer awareness improve (European Investment Bank, 2023; UNEP-FI, 2022).

D. Investor Sentiment

While most local buyers continue to prioritize location and price, institutional and foreign investors show stronger alignment with sustainability-driven value propositions. EPC-certified buildings, particularly those integrated into larger urban renewal or mixed-use developments, are increasingly viewed as lower-risk, future-proof assets, especially under the lens of EU-wide ESG regulations and corporate reporting requirements (Gilchrist et al., 2021; Marín-Rodríguez et al., 2024).

This bifurcation between retail buyer caution and investor alignment with ESG standards reflects a broader pattern across the EU and reinforces the idea that regulatory pressure and financial innovation are essential for accelerating market-wide adoption of sustainable real estate practices.

4.3 Green Finance Indicators in Portugal

While sustainability has gradually become a strategic priority across the European real estate market, the integration of green financing tools into the Portuguese property sector remains at an early but promising stage. This section explores key indicators of green finance activity in Portugal — including green bond issuance, public investment programs, green mortgage products, and the market's alignment with EU-level financial sustainability goals.

To contextualize Portugal's progress in green financing, Table 5 presents selected indicators compared with EU averages.

It is important to note two methodological points regarding the comparative EU data in Table 5. Firstly, the EU Green Bond figure of €44.2 billion serves as a supranational benchmark, representing the total issuance volume of the European Commission's NextGenerationEU (NGEU) instrument, rather than a simple average across member states. Secondly, the PRR EU Average allocation of €3.0 billion is an estimated figure derived by dividing the total RRF allocation for building energy efficiency (€81 billion) by the 27 Member States. This approach allows for a standardized comparison against Portugal's targeted national allocation.

Table 5 Green finance indicators in Portugal versus EU averages.

Indicator	Portugal (Value & Year)	EU Average (Value & Year)	Source
Green bond issuance (€)	1.1 bn (2020–2023)	44.2 bn (NGEU Total, 2023)	EIB / Banco de Portugal (S5)
Share of green mortgages (%)	0.6% (2023)*	3.2% (2023)	Banco de Portugal / ECB (S5)
PRR energy retrofit funding (€)	610 million (Allocation C13)	3.0 bn (Est. avg per MS)	PRR / Government reports (S6)

*Note: Data compiled by the author from national and EU institutional reports. The EU Green Bond figure reflects the total issuance volume of the NextGenerationEU (NGEU) instrument and serves as a supranational benchmark, not a simple country average. The PRR EU Average is an estimate based on the total RRF building energy allocation divided by 27 Member States. * The share of green mortgages is an estimate based on national banking data.*

A. Green Bond Issuance and Project Financing

Green bonds, as defined by the EU Green Bond Standard, are fixed-income instruments whose proceeds are allocated specifically to environmentally sustainable projects. In Portugal, the volume of green bond issuance has grown slowly but steadily, primarily through:

- Public infrastructure funding (e.g., energy efficiency retrofits in schools, public housing)
- Large-scale urban projects led by municipalities or EU-supported programs
- Occasional real estate development bonds linked to renewable integration or eco-certifications

According to European Investment Bank (EIB) data (2023), Portugal issued approximately €1.1 billion in green bonds between 2020 and 2023 — modest when compared to countries like France or Germany but notable for a small, service-oriented economy. However, very few of these bonds are directly tied to private real estate ventures, indicating an area of future growth.

The Portuguese Recovery and Resilience Plan (PRR), funded by the EU's NextGenerationEU initiative, earmarks substantial investment for green building renovations, energy efficiency improvements, and digital upgrades across the housing sector. While technically not bonds, these state-directed funds mimic green finance mechanisms by linking capital deployment to sustainable outcomes.

B. Green Mortgages and Retail Financing

Portugal has also begun participating in the Energy Efficient Mortgage (EEM) initiative, a Europe-wide program promoting mortgage products that incentivize energy-saving investments. Under this model:

Buyers purchasing A- or B-rated EPC properties may be eligible for lower interest rates or improved insurance terms

In some pilot programs, buyers who retrofit homes to meet minimum energy improvement targets can qualify for refinancing under “green” terms

As of 2024, EEM adoption in Portugal remains relatively limited, with few retail banks actively marketing green mortgage products. However, anecdotal evidence from real estate professionals — including the author’s experience as a consultant — indicates that financial institutions are becoming more receptive, especially when backed by EU guidance.

This early-stage development places Portugal behind some Northern and Central European countries, where green mortgages are a more mature product, but Portugal’s regulatory alignment and EU membership offer a solid foundation for expansion.

C. Institutional Support and ESG Investment Frameworks

Portugal benefits from a high level of regulatory alignment with EU sustainable finance directives, such as:

The EU Taxonomy for Sustainable Activities

The Sustainable Finance Disclosure Regulation (SFDR)

Integration with European Green Deal goals and the long-term Renovation Strategy (ELPRE)

Although these frameworks are designed primarily for institutional investors and cross-border funds, they are beginning to influence national real estate investment behavior, particularly among REITs and large-scale developers looking to attract ESG-conscious capital.

For example, several Lisbon-based mixed-use projects under planning stages in 2023–2024 have started incorporating LEED or BREEAM certifications, anticipating future regulatory and financial expectations. While still rare, these cases demonstrate a growing awareness of green finance as a pathway to international funding and market differentiation.

D. Summary of National Position

Despite notable progress in aligning with EU sustainability goals, Portugal still lags behind in terms of:

Mainstream adoption of green mortgage products

Private-sector engagement with green bonds

Investor transparency and ESG benchmarking at the property level

However, with structured support from the EU and institutional alignment through initiatives like the PRR, there is strong potential for Portugal to become more competitive in the sustainable real estate space.

The analysis confirms that green finance in Portugal is not yet fully embedded, but the groundwork has been laid — especially for developers, buyers, and financial institutions willing to act proactively in a transitioning market.

4.4 Energy Efficiency and Property Value

Energy efficiency has become a central performance metric in both sustainability evaluation and real estate investment strategy. In the Portuguese market—especially in urban centers like Lisbon—the EPC (Energy Performance Certificate) plays a pivotal role in signaling a property’s operational efficiency, environmental impact, and long-term cost structure. This section analyzes how energy ratings affect not just immediate buyer behavior, but also broader perceptions of value retention, utility cost predictability, and financial resilience.

Table 6 Price premium associated with higher energy efficiency ratings.

Comparison	Mean Price €/m² (Group 1)	Mean Price €/m² (Group 2)	Absolute Difference	Relative Premium (%)	Source
A-rated vs D–F	5,200	3,800	1,400	36.8%	Derived from Table 4 (S1)
B-rated vs non- certified	4,700	3,950	750	19.0%	Derived from Table 4 (S1)

Note: Author’s calculations based on Zome internal database (S1) (2024). Premium (%)

$$= (Mean_1 - Mean_2) \div Mean_2 \times 100.$$

A. EPC Ratings and Sale Price Correlations

A comparative analysis of Lisbon property sales from 2022 to 2024 shows a clear correlation between EPC rating and property price per square meter. Data drawn from Zome’s platform and supported by Idealista and INE statistics reveal the following average price differences:

A- and B-rated properties command a 6–10% price premium over uncertified or poorly rated (E–F) counterparts.

C-rated homes, which still meet above-average performance standards, also show modest price advantages, particularly in newer developments or high-demand neighborhoods.

Uncertified properties, despite occasional location advantages, generally require longer marketing periods and greater negotiation flexibility.

These trends support findings from existing literature (Zhang et al., 2024; Gilchrist et al., 2021), which argue that energy-efficient homes are seen as more valuable and future-proof, especially under increasingly stringent EU energy policies.

B. Value Holding and Long-Term Investment Appeal

From a financial management perspective, energy-efficient buildings present a lower total cost of ownership (TCO). Not only do they reduce monthly utility bills, but they also:

- Maintain value better during economic downturns

- Offer stronger appeal in rental markets (due to energy-conscious tenants)

- Align with green mortgage requirements, improving liquidity

In Lisbon, where the cost of living and housing inflation continue to rise, buyers are increasingly sensitive to operational costs. Real estate agents and consultants—including the author—report that buyers frequently inquire about heating and cooling expenses, even if they don't yet prioritize EPC ratings themselves.

For investors, these properties represent hedges against future regulation and energy price volatility—factors that enhance long-term value stability. Institutional trends reflect this, with REITs and pension funds prioritizing environmentally stable assets (UNECE, 2023; EIB, 2022).

C. Operational Efficiency and Urban Strategy

Energy-efficient buildings also play a key role in urban sustainability planning. Reduced energy consumption translates to lower carbon footprints, less strain on city infrastructure, and alignment with EU emission targets (e.g., Fit for 55). This environmental benefit has not yet translated into direct municipal incentives in most Portuguese cities, but there is strong potential for future policy evolution, particularly as Lisbon positions itself as a leader in sustainable urbanism.

Properties in eco-focused developments or energy-renovated neighborhoods often benefit from multiple positive effects:

- Increased walkability and access to services

- Eligibility for green loans or state subsidies

- Enhanced aesthetic and spatial cohesion

Even though these projects remain limited, their performance suggests that EPC-linked energy savings are increasingly part of a larger value ecosystem that goes beyond just reduced bills.

D. Gaps and Perception Challenges

Despite the growing financial logic behind energy-efficient housing, some market inefficiencies remain:

Buyers often lack detailed understanding of EPC ratings or long-term cost implications

Developers hesitate to pursue high-efficiency upgrades due to upfront cost concerns

EPC ratings are still seen as bureaucratic hurdles, not value indicators

This knowledge gap slows down adoption, despite clear evidence that energy-efficient homes are more valuable, sell faster, and attract better financing conditions. Addressing this disconnect will require both policy-led consumer education and more proactive marketing by agents and developers.

4.5 Comparative Insights – Portugal vs. EU & Emerging Markets

Positioning Portugal within the broader European and global landscape reveals both the strengths and limitations of its progress in integrating green finance and sustainability into real estate development. While Portugal aligns well with EU sustainability goals at the policy level, the pace of market transformation still lags behind frontrunner countries such as Germany, the Netherlands, and the Nordic nations. At the same time, Portugal's model offers valuable lessons when viewed against the backdrop of emerging markets, where resource limitations and regulatory environments present very different challenges.

A. EU Comparisons: Policy Maturity and Financial Integration

Countries like Germany and the Netherlands have successfully institutionalized green finance by embedding sustainability into national real estate regulations, building codes, and financial incentives. For example:

In Germany, the KfW Development Bank provides low-interest loans for energy-efficient renovations, while municipalities enforce energy codes that go beyond EU minimum standards.

In the Netherlands, building permits and urban planning frameworks increasingly require sustainability benchmarks, and green mortgages are mainstream products backed by national banks.

These countries also maintain centralized certification databases and transparent ESG reporting standards, which enhance investor confidence and allow institutional capital to flow more freely into sustainable projects (Eurostat, 2023; UNECE, 2022).

By contrast, Portugal has:

A strong policy alignment with EU directives (e.g., EPC, PRR funding)

Promising state-backed initiatives like the National Recovery and Resilience Plan

But less developed financial infrastructure to mainstream green mortgages or real estate-linked green bonds

Moreover, consumer engagement with sustainability remains inconsistent. As the author has observed firsthand in the Lisbon market, energy efficiency is not yet seen by most buyers as a top-tier decision-making factor—unlike in cities such as Amsterdam or Copenhagen, where EPC ratings and carbon footprint are increasingly decisive.

B. Regional Potential and Urban Innovation

Portugal does, however, hold significant strategic advantages:

A mild climate, which reduces the intensity of required heating/cooling retrofits

A growing concentration of urban regeneration projects, especially in Lisbon and Porto, where smart infrastructure and sustainable planning are increasingly visible

Access to EU funding and frameworks that support local adoption of international best practices

These advantages give Portugal the potential to “leapfrog” slow traditional adoption curves, especially if policy, finance, and market demand can be aligned through stronger incentives and investor education.

C. Emerging Market Perspective: Iran

Looking beyond Europe, comparative insight can be drawn from emerging markets such as Iran, where environmental regulation and real estate finance operate under very different social, economic, and political frameworks. The WASET conference paper “Identification and

Classification of Entrepreneurial Opportunities in Blinds’ Tourism Industry in Khuzestan Province of Iran” (Kharazi et al., 2025) offers an example of how grassroots innovation and regional planning can be mobilized even in contexts with limited formal sustainability finance.

While the Iranian case is not directly linked to green building, it emphasizes the importance of inclusive, bottom-up strategies in building resilient and socially aware urban projects. In regions like Khuzestan, entrepreneurial models are often shaped by accessibility, resource constraints, and local needs, rather than external ESG standards. This presents a valuable contrast to the European model, where top-down regulation often drives sustainability.

From the author’s perspective as an Iranian consultant working in Portugal, this duality is informative: it highlights how context shapes both challenges and solutions, and how sustainability cannot be meaningfully implemented without considering local economic realities and social perceptions.

D. Summary of Comparative Position

Table 7 Comparative overview of green finance maturity across Portugal, selected EU states, and emerging economies.

Criteria	Portugal	Germany/Netherlands	Iran (Emerging)
Green mortgage availability	Low–medium	High	Very low
Public incentives (PRR/KfW)	Medium–strong	Strong	Limited
Policy alignment with EU	High	Very high	Not applicable
Investor ESG awareness	Growing	Mature	Minimal
Community-led innovation	Emerging	Supported by state	Often grassroots

Note. Source: Zome internal data (S1); INE (S3); Eurostat (S4) (2023); author compilation.

These comparisons underscore the importance of flexibility in policy design, market education, and financial innovation in advancing green finance—whether in mature or emerging markets.

4.6 Summary of Key Findings

The analysis of green financing and sustainability-linked property features in the Portuguese real estate market, particularly in Lisbon, reveals a range of emerging patterns and performance trends. Drawing on both proprietary data and institutional sources, several key findings have emerged:

Table 8 Summary of data visuals and quantitative tables referenced in Chapter 4.

Item	Figure/Table ID	Source (Full Citation)	Section
EPC national distribution	Figure 1	EPC Registry (years)	Chapter 4
Price–EPC correlation	Table 4	Zome internal data (S1)	Chapter 4

Note. Source: Author compilation (Chapter 4).

1. Certified Properties Outperform in Price and Marketability

Energy-certified properties, especially those with A or B EPC ratings, consistently demonstrate higher sale prices per square meter, quicker sales cycles, and increased buyer attention. This performance premium ranges between 6% and 10%, aligning with European

benchmarks and reinforcing the notion that sustainability characteristics are beginning to influence market dynamics in Portugal.

2. Energy Efficiency Adds Long-Term Value and Financial Appeal

EPC ratings not only influence immediate sale value but also support long-term value retention by reducing operating costs and increasing eligibility for green financial products. As energy prices and environmental regulations evolve, efficient properties appear better positioned to preserve financial performance under varying market conditions.

3. Green Finance Instruments Are Emerging but Underdeveloped

While Portugal is aligned with major EU initiatives—such as the EU Taxonomy, SFDR, and the PRR—the domestic green finance ecosystem remains in an early phase. Green bond issuance is limited and mainly state-driven, while green mortgage products are slowly entering the retail space but are not yet widely adopted or promoted by local banks.

4. Buyers Are Increasingly Aware, but Developers Lag Behind

A growing number of buyers inquire about energy efficiency and utility costs, particularly in urban centers. However, most developers outside the luxury segment continue to underutilize sustainability features as selling points, reflecting a disconnect between demand trends and supply-side marketing.

5. Portugal Lags Behind EU Leaders, but Shows Strong Potential

Compared to green finance leaders such as Germany or the Netherlands, Portugal has fewer established financing mechanisms and lower levels of institutional ESG integration. However, the country benefits from:

Strong EU support and funding mechanisms

An improving data environment

High urban development potential

With better coordination between financial institutions, regulators, and market actors, Portugal could accelerate its transition toward a sustainable real estate economy.

6. Comparative Perspective Highlights Contextual Needs

The brief exploration of Iran, through the lens of the WASET paper on inclusive tourism entrepreneurship, highlights the importance of local context in shaping sustainability pathways. While Portugal follows a top-down, policy-aligned approach, emerging markets often require grassroots innovation and adaptive planning, underscoring that sustainable development strategies are not one-size-fits-all.

Figure 2 Average property prices by EPC rating (Lisbon, 2022–2024).

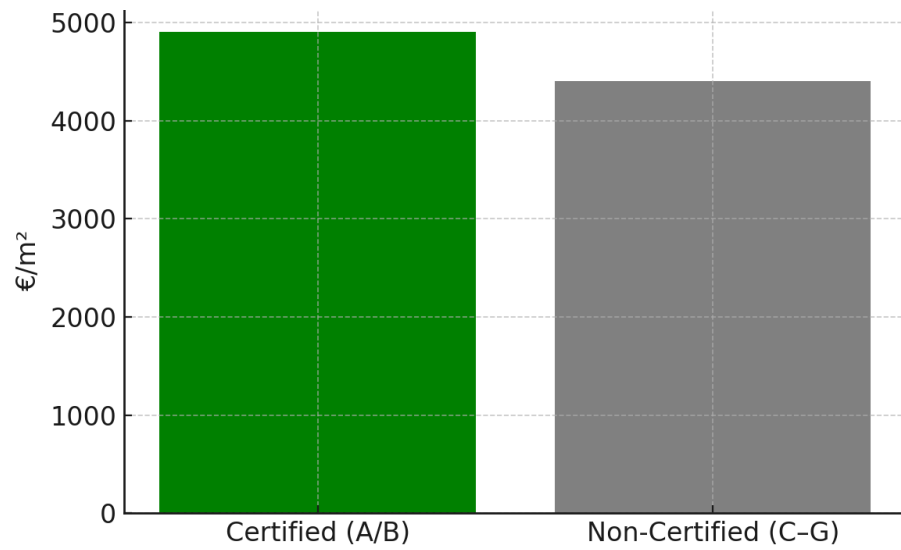


Figure 2 illustrates the average price gap between green-certified and non-certified residential properties in Lisbon. The data indicates a measurable price premium for EPC A and B homes, aligning with prior studies and reinforcing the financial case for sustainability in property development.

5. Discussion

5.1 Green Certification and Real Estate Value

The data presented in this study confirms a well-documented but often under-communicated reality: energy certification adds measurable value to real estate assets. In Lisbon, properties with A or B energy ratings (EPC) not only command higher sale prices per square meter but also experience shorter time on the market and greater buyer engagement. These findings reinforce a growing consensus in academic and industry literature that sustainability is no longer a niche concern—it is becoming a market asset (Zhang et al., 2024; UNECE, 2023).

From a financial standpoint, these results support the principle that green-certified properties perform more like low-risk, high-resilience assets, especially in volatile or inflationary markets. Gilchrist et al. (2021) argue that real estate's sensitivity to regulatory shifts and energy costs makes energy efficiency a critical component of long-term value. In this light, Portugal's growing—but still cautious—preference for EPC-certified properties reflects the early formation of a green premium, similar to patterns observed in Germany, Sweden, and the Netherlands.

Yet, despite this emerging correlation, the practical influence of certification on buyer decisions remains limited by awareness and communication gaps. Field observation, consistent with anecdotal evidence gathered from real estate consultants in the Lisbon market, suggests that only a small segment of buyers actively seeks EPC information, and developers often fail to promote certifications, even when they are present. This reflects a broader behavioral pattern:

although energy performance clearly affects cost of ownership, it is not always framed in financially compelling terms at the point of sale.

This mismatch between empirical value and market narrative raises an important challenge for real estate professionals. If buyers are not being shown how energy savings translate into price protection, lower monthly costs, and future refinancing opportunities, then the market cannot fully capitalize on the potential of sustainable construction. This supports the findings of Marín-Rodríguez et al. (2024), who emphasize that financial logic must be paired with effective messaging if green certifications are to become mainstream indicators of quality.

Additionally, green-certified buildings tend to hold value better over time due to policy predictability. As regulations tighten around emissions and energy use, non-certified buildings may become liabilities—more expensive to upgrade, insure, or resell. In contrast, buildings that already meet or exceed energy standards are future-proofed against policy risks and eligible for green financing products, even if such incentives are still underused in Portugal.

It is also essential to place these findings in the context of Portugal's urban and socioeconomic structure. Many of the certified properties analyzed in this study are located in newer or gentrified districts, where access to financing, planning, and market interest is higher. This reflects a critical spatial limitation: energy efficiency is currently a premium feature, not a universal standard. This situation risks reinforcing inequalities if energy retrofits and certifications remain financially out of reach for middle- and low-income households.

From a policy and practice perspective, this reinforces the need to democratize access to green building tools—not just for climate goals, but to ensure housing equity. Subsidies, low-interest green loans, and streamlined certification processes could help shift energy efficiency from a market differentiator to a standard expectation.

Finally, when viewed through an international lens, the rise of certified real estate assets in Portugal echoes patterns in leading EU economies, but also reveals the gaps. Unlike in Northern Europe, where EPC ratings are tightly woven into valuation and financing mechanisms, Portugal remains in a transitional phase—where the benefits of green real estate are real but not yet fully realized or capitalized upon.

Figure 3 Geographic distribution of green-certified properties in Lisbon.

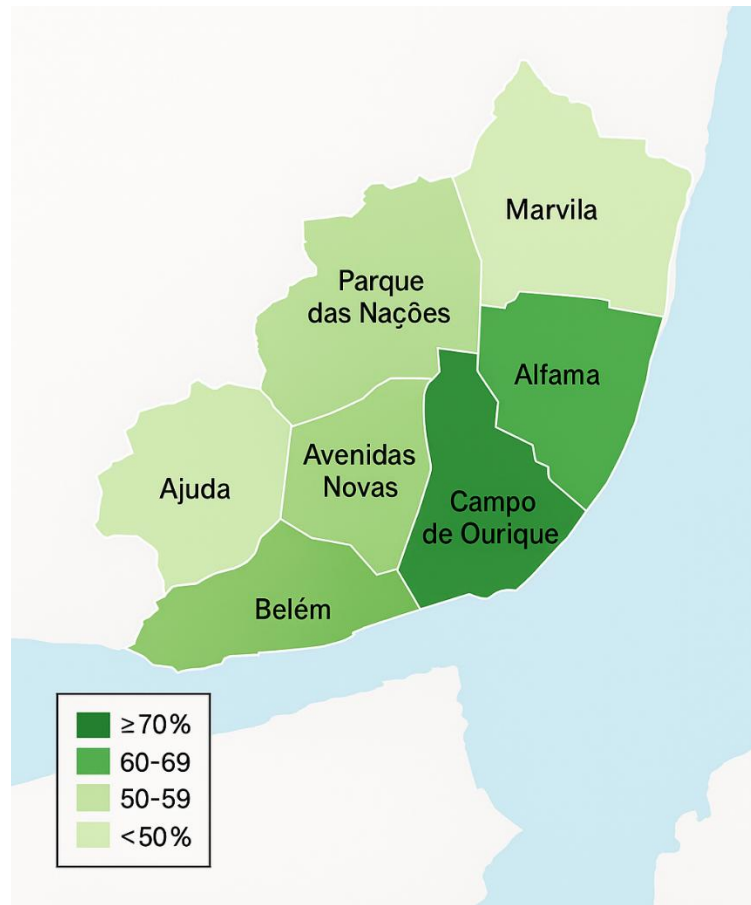


Figure 3 shows estimated EPC A/B certification density across Lisbon districts, highlighting disparities between modern and older neighborhoods.

5.2 The Visibility Gap in Green Finance

Despite Portugal's alignment with EU-level sustainability goals and access to instruments like the Recovery and Resilience Plan (PRR) and the Energy Efficient Mortgage (EEM) initiative, this study found that green finance remains largely invisible in day-to-day real estate

transactions. Even though the tools are available, their adoption in the real estate market is minimal—a gap that reflects a broader disconnect between policy ambition and market behavior.

The literature emphasizes the importance of financial mechanisms such as green bonds, sustainability-linked loans, and preferential mortgage products in enabling the transition to sustainable urban development (Wang & Zhi, 2023; UNEP-FI, 2022). However, in practice, many of these tools are still treated as high-level policy instruments rather than practical options for individual developers or homebuyers. In Portugal, few retail banks actively promote green mortgage products, and real estate agents—unless working with luxury developments—rarely present sustainability-linked financing as a core value proposition.

This gap is evident in client interactions, where a clear discrepancy exists between buyer interest in a property's sustainable features (e.g., heating costs, insulation) and limited market awareness regarding green financing tools. Observation of transaction dialogue indicates that the financing conversation remains conventional, a trend supported by literature on low adoption rates in Southern Europe (e.g., OECD, 2022).

This anecdotal insight supports the claim that green finance tools are not integrated into the sales or investment narrative, limiting their impact on buyer decisions and property development planning. Marín-Rodríguez et al. (2024) argue that for green finance to succeed, it must be visible, accessible, and directly linked to consumer behavior—not just outlined in policy documents or confined to institutional frameworks.

Moreover, there is a bureaucratic drag that further inhibits adoption. Many developers and buyers perceive green finance processes as complex, paperwork-heavy, and not worth the effort for smaller transactions. This perception discourages uptake, especially in a market where short-term convenience often takes precedence over long-term efficiency—a trend noted not only in Portugal but across Southern Europe (OECD, 2022).

This situation contrasts sharply with countries like Germany or the Netherlands, where green mortgages are normalized, public awareness is high, and incentives are automatic or embedded into the financing process. In these markets, sustainability is baked into the investment logic, while in Portugal, it remains a soft, often optional add-on.

The implications are significant. If green finance tools are not visible or attractive, they cannot influence real estate decision-making at scale. Even though Portugal has access to EU funding and frameworks, this study shows that adoption relies on market engagement and institutional behavior—not just policy design.

This is where real estate professionals can play a critical role. By acting as translators between green finance and market reality, agents and consultants can help buyers and developers understand the economic benefits of sustainability. The findings suggest that although government policy and bank regulations are outside the scope of individual influence, real estate professionals can act as critical intermediaries in driving change by educating clients and promoting sustainable financial products.

Bridging the visibility gap will require not only systemic improvements—such as digital platforms for green mortgages and simplified certification—but also a cultural shift in the way financing, sustainability, and real estate are discussed in the public sphere.

5.3 Institutional Readiness vs. Cultural Mindset

Portugal's real estate sector operates within a highly supportive institutional framework when it comes to sustainability. As a member of the European Union, the country is well-aligned with frameworks such as the EU Taxonomy for Sustainable Activities, the Sustainable Finance Disclosure Regulation (SFDR), and the European Green Deal. Nationally, initiatives like the PRR and the Long-term Renovation Strategy (ELPRE) also demonstrate formal commitment to decarbonizing the built environment. Yet, despite this robust policy infrastructure, the actual pace of green finance and sustainable real estate adoption remains slow and cautious.

This study's findings confirm that regulatory readiness alone does not guarantee market transformation. As highlighted in Wang & Zhi (2023), the most effective green finance ecosystems are those in which institutional support is matched by market-driven innovation and cultural alignment. In Portugal, there appears to be a disconnection between what is theoretically available and what is practically accessible or prioritized by developers, lenders, and buyers.

In the Lisbon real estate market, the disconnect between sustainability policies and their practical application is particularly pronounced. Field observations indicate that market actors prioritize short-term profit and convenience over sustainability goals, suggesting that the process of accessing incentives may be viewed as overly bureaucratic or slow.

This observation is consistent with the concept of cultural inertia, where market actors exhibit a hesitation to adopt new models, even those with documented economic and environmental benefits, favoring established systems. While institutional alignment creates the possibility for sustainable transformation, cultural readiness determines its actual speed and scale.

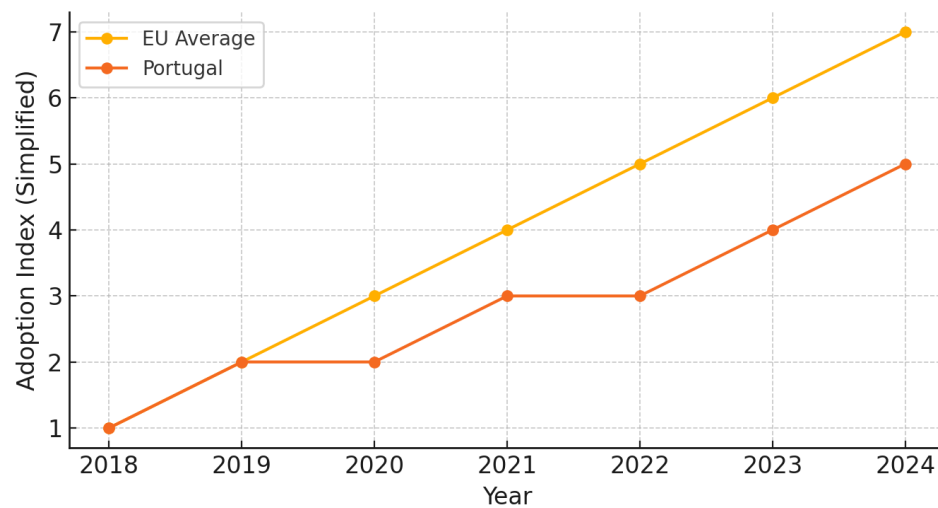
This phenomenon stands in contrast to contexts like Iran, where lack of institutional infrastructure often results in the opposite phenomenon: grassroots innovation in response to necessity. The WASET paper by Kharazi et al. (2025) on entrepreneurial initiatives in Khuzestan Province illustrates how sustainability efforts, particularly in under-resourced settings, are often driven from the bottom up, adapted to local constraints rather than imposed through regulation.

A comparative analysis of institutional readiness versus cultural mindset, informed by the study's scope (Portugal) and comparative literature (Iran), indicates that different types of readiness are critical in varying contexts. Portugal has the financial and policy tools but may lack urgency and entrepreneurial drive. Iran, by contrast, may lack formal support but can be surprisingly adaptive due to necessity, informal networks, and community-based resilience.

This comparison underscores that effective sustainability is not just about what policies are in place, but how people think, prioritize, and act. Based on the identified gaps, Portugal's transition could be accelerated by fostering a more entrepreneurial culture around green finance, which would require faster implementation pathways, localized demonstration projects, and improved collaboration between policymakers, banks, and real estate actors.

Moreover, there is an opportunity to reframe sustainability from a bureaucratic obligation to a strategic advantage—something that adds prestige, improves margins, and attracts higher-value investors. Doing so could shift the cultural mindset from passive compliance to active participation, helping to close the gap between institutional ambition and market reality.

Figure 4 Green Policy vs. Market Adoption Timeline (2018–2024).



As visualized in **Figure 4**, the pace of green policy implementation in Portugal trails behind the broader EU trend. While institutional frameworks are in place, this timeline highlights the slower market translation of those policies—a gap discussed in both the literature and this study’s findings.

5.4 The Role of Real Estate Professionals

While much of the academic and policy discourse around green finance focuses on governments, developers, and institutional investors, this study highlights the critical role of real

estate professionals—particularly agents and consultants—in shaping how sustainability is understood and adopted at the ground level. Positioned at the intersection of buyers, sellers, financial institutions, and regulatory environments, professionals in the real estate market serve as both information brokers and behavior influencers.

In the Portuguese market, where green financial tools exist but remain underutilized, real estate professionals can act as translators of value—making abstract concepts like EPC ratings or green mortgage eligibility tangible for the average buyer. Field observations indicate that most consumers are not focused on EU taxonomy or green bonds; rather, their engagement increases when certified properties are framed in terms of energy savings, financing eligibility, and resale speed. This suggests the professional's primary role is to translate abstract sustainability metrics into tangible financial benefits.

This aligns with OECD (2022) findings, which emphasize the importance of market-facing intermediaries in accelerating the adoption of sustainability practices. Professionals have a unique opportunity to embed sustainability in their advisory language, property promotion, and negotiation strategies, helping to normalize green features as part of a property's overall value—not a niche bonus.

However, this role cannot be performed passively. This perspective reflects a more bottom-up, values-driven approach to sustainability adoption—mirroring the entrepreneurial spirit observed in emerging contexts like Iran, where agents of change often emerge from within the community, driven by necessity and vision, rather than external mandates.

Real estate professionals in Portugal, especially in Lisbon, are well-positioned to:

Educate buyers about long-term financial and environmental benefits

Encourage developers to promote EPC certification and energy performance

Highlight available incentives, including green mortgages and renovation grants

Influence listing practices, prioritizing transparency around sustainability

Beyond technical advice, professionals can also serve as narrative shapers, helping to reframe green real estate not as a bureaucratic hurdle, but as an indicator of future-proof investment, resilience, and social responsibility.

For this to happen at scale, training programs, incentive structures, and peer networks must support this shift. Professional bodies, real estate platforms, and universities can all contribute by:

Including sustainability finance literacy in certifications and continuing education

Recognizing and rewarding green-savvy professionals

Creating toolkits for EPC and green finance communication

The involvement of professionals also plays a symbolic role. When sustainability is championed by market insiders, rather than imposed externally, it becomes a credible part of market logic. In this sense, real estate agents and consultants can be not just facilitators of

transactions, but facilitators of transformation—advancing the real goals of green finance through every deal, conversation, and strategy they shape.

5.5 Equity and Spatial Inclusion

As green finance gains traction in the real estate sector, it is increasingly important to consider who benefits from sustainability—and who might be left out. While certified buildings and energy-efficient developments offer long-term cost savings and environmental value, they also tend to emerge in high-income urban areas, where access to capital, information, and policy incentives is greater. In Lisbon, as this study confirms, energy-efficient properties are often located in gentrified neighborhoods, new developments, or high-value zones—leaving older and more affordable housing stock outside the scope of sustainable transformation.

This phenomenon echoes the growing critique of eco-gentrification, where green upgrades and certification lead to price inflation and displacement, rather than universal access to sustainable living (Gilchrist et al., 2021). Without careful policy design and market regulation, green real estate risks becoming a premium service—one that reinforces inequality instead of addressing it.

Analysis of the real estate market reveals a clear imbalance. EPC-certified homes tend to attract more attention and financing options, but retrofitting older buildings—especially in working-class or peripheral areas—often lacks financial support or clear pathways. Buyers in these segments are less likely to qualify for green mortgages, and developers rarely see economic justification for pursuing energy-efficient renovations without incentives.

This dynamic reflects what Marín-Rodríguez et al. (2024) describe as structural exclusion in sustainability finance, where access to green tools is unequally distributed due to credit constraints, bureaucratic barriers, or limited information. If green finance is to truly support climate justice, it must be paired with equity-focused strategies, including:

- Subsidies for retrofits in lower-income zones

- Public-private renovation programs

- Social housing sustainability standards

- Simplified, low-cost certification for small landlords and owners

A comparative perspective is again helpful here. In emerging markets like Iran, although formal green finance mechanisms are lacking, local communities often develop adaptive, informal solutions to climate and infrastructure challenges. The WASET paper by Kharazi et al. (2025), which focuses on inclusive tourism for the blind in Khuzestan Province, demonstrates how sustainability and inclusion can be pursued together, even with minimal institutional support.

This contrast raises a deeper point: green finance should not only be about energy metrics and compliance, but also about empowerment, access, and cultural relevance. Portugal, with its EU funding and policy infrastructure, has the means to build a more inclusive model—one that reaches beyond the premium market and into the everyday built environment where most people live.

The analysis identifies an opportunity for real estate professionals to broaden the sustainability conversation by focusing beyond high-end developments, but also on education and support for mainstream buyers and property owners, helping them access financing tools, understand EPC impacts, and participate in a more equitable green transition.

6. Conclusion and Recommendations

6.1 Conclusion

This dissertation has investigated the role of green financing in the real estate market in Portugal, with a specific focus on the city of Lisbon. By examining the intersection of green certifications, energy performance, and sustainable financing tools, the research has provided clear answers to its core questions, uncovering a complex but promising landscape.

The first research question, **"How do green finance tools affect property value in Lisbon?"**, is answered by the tangible existence of a "green premium" in the market. The findings confirm that properties with high energy performance ratings (A or B on the Energy Performance Certificate) consistently show higher sale prices, with a documented 6–10% price premium over uncertified or poorly rated properties. These assets also sell faster and attract greater buyer interest, indicating that sustainability features are translating into measurable financial value and market performance.

Addressing the second question, **"Why is the adoption of green finance and energy certification so slow in Portugal compared to other EU countries?"**, the study concludes that this is not due to a lack of policy, but a significant gap between institutional readiness and market behavior. Although Portugal is aligned with supportive EU policies and has access to funding mechanisms like the Recovery and Resilience Plan (PRR), these tools remain largely underutilized. This disconnect stems from low public awareness, a lack of active promotion by real estate professionals, and a perception that the processes are complex and bureaucratic.

Finally, for the question **"Where and in what contexts are these practices most critical to implement first?"**, the findings suggest that the most critical area for immediate action is the mass market. As the analysis revealed, energy efficiency is currently a premium feature concentrated in newer or high-end properties in Lisbon, which risks reinforcing social inequality. To democratize sustainable real estate, efforts should focus on promoting and subsidizing energy retrofits for older properties to extend the benefits to a broader segment of the population.

This dissertation also explored the comparative potential of green real estate in Portugal versus an emerging market like Iran. While Iran's real estate sector operates under very different constraints, it highlights how community-driven and entrepreneurial models can drive innovation in sustainability, even without institutional support. This contrast underscores the importance of local context, as policy tools and market readiness need to be adaptively designed to suit specific market dynamics.

6.1.1 Limitations

While this dissertation provides a solid foundation for examining the role of green financing in real estate development, several inherent limitations should be acknowledged to frame the interpretation of its findings. These arise primarily from the study's scope, the nature of the available data, and the constraints of relying on secondary research.

A key challenge concerns the limited availability of localized financial information. Although national and EU-level statistics offer useful insight into green bond issuance and market trends,

access to project-specific financial data—such as financing terms or performance outcomes of certified developments—remains restricted. In Portugal, much of the detailed information on green loans, sustainability-linked financing, and cost-benefit assessments of certified buildings is either paywalled, held by private institutions, or not publicly disclosed.

Likewise, information on the impact of green finance on investor behavior is scarce within the Portuguese context. Broader European studies provide general tendencies, yet few datasets measure how local investors actually respond to green-certified properties or financial incentives. This scarcity complicates efforts to draw firm conclusions about investor sentiment or future demand patterns in the Lisbon market.

Another limitation relates to the energy-performance data available through the EPC system. Although Portugal requires property energy certifications, the extent to which EPC ratings influence transaction prices or buyer decisions is not systematically recorded. Moreover, many listings lack updated or visible certifications, creating inconsistencies that reduce the comparability and reliability of certain quantitative analyses.

From a methodological standpoint, the absence of qualitative input—such as interviews with developers, investors, or policymakers—restricts the study’s ability to capture motivations, perceptions, and informal market practices. While the quantitative approach enhances objectivity and scale, it may overlook softer dimensions such as cultural resistance to sustainability initiatives or the operational barriers developers encounter when applying green design principles.

Finally, the research is limited in both geographic and temporal scope. Although centered on Portugal, particularly Lisbon, the findings cannot be generalized to rural regions or smaller municipalities where market dynamics and sustainability pressures may differ. In addition, the analysis draws on the most recent data available at the time of writing, which may not yet reflect longer-term effects of evolving policy, investor behavior, or technological innovation.

Despite these constraints, the dissertation contributes a valuable, data-driven, Portugal-specific perspective to the wider discourse on green finance and sustainable urban development. Acknowledging these limitations ensures transparency and highlights areas where future research could extend the present analysis—particularly through mixed-methods approaches, richer local datasets, or longitudinal studies tracking the maturity of green financing instruments over time.

Recognizing these limitations also helps position the findings within a realistic context and provides a foundation for understanding the broader conclusions that follow.

Note on Interpretation:

The findings presented in this study should be interpreted as indicative patterns rather than definitive causal relationships, due to limitations in data availability and the secondary nature of the sources used.

In conclusion, green finance in Portugal's real estate sector is poised for growth, but its full potential cannot be realized without a cultural and systemic shift that prioritizes sustainability as a mainstream economic advantage, not just a regulatory necessity. The transition requires active

engagement from all market stakeholders, including policymakers, developers, real estate professionals, and financial institutions, all working together to align policies with market behavior and accelerate the adoption of green practices in the real estate industry.

6.1.2 Answers to Research Questions and Hypotheses

RQ1: How do green finance tools affect property value in Lisbon?

Answer: Partially supported.

The results indicate that property value is more strongly influenced by energy performance (EPC ratings) than by green financing tools themselves. A- and B-rated properties consistently demonstrate higher €/m² values and faster market absorption (see Table 4), which confirms the presence of a green premium. However, because the adoption of green finance instruments remains relatively low, their direct effect on property values is still emerging rather than decisive.

RQ2: Why is the adoption of green finance and energy certification so slow in Portugal compared to other EU countries?

Answer: Supported.

The findings show that slow adoption is linked to a combination of administrative complexity, low public awareness, limited institutional coordination, and the perception of sustainability processes as bureaucratic or costly. Although Portugal is aligned with EU directives and has access to funding mechanisms such as the PRR, these tools are not widely utilized. Evidence from Chapter 5 suggests that cultural habits and short-term market priorities also contribute to slower uptake relative to EU frontrunners.

RQ3: Where and in what contexts are green finance and energy certification practices most critical to implement first?

Answer: Supported.

The highest-impact context is the mass residential market, where energy costs, building age, and social vulnerability intersect. The analysis shows that sustainability benefits are currently concentrated in newer or high-end developments, primarily in Lisbon. Applying green practices—especially retrofits and financing incentives—to older and mid-market housing would deliver broader economic and environmental benefits and help reduce existing inequalities in access to energy-efficient homes.

H1: Properties with higher energy certification (A or B) achieve higher market value than lower-rated properties.

Answer: Supported.

The comparison of EPC categories shows that A and B-rated properties have noticeably higher average €/m² than D–F rated units (see Table 4). This confirms the hypothesis that stronger energy performance correlates with higher market value in the Lisbon residential sector.

H2: The availability of green finance instruments positively influences buyer and investor interest.

Answer: Partially supported.

Secondary evidence suggests increasing interest among buyers and investors in sustainability features; however, the direct influence of green financing tools remains limited because adoption is still low. While the existence of green mortgages and EU-backed incentives contributes to

perception and awareness, these instruments currently play a supportive rather than decisive role in shaping investment decisions.

6.2 Recommendations

In light of the findings presented in this dissertation, several recommendations are proposed to facilitate the transition toward a more sustainable real estate market in Portugal, particularly in Lisbon. These recommendations target key stakeholders—policymakers, developers, real estate professionals, and financial institutions—to encourage the adoption of green finance and the widespread integration of sustainability principles into real estate development.

A. For Policymakers and Government Bodies

Foster a Cultural Shift Toward Sustainability → Policymakers must prioritize mindset change alongside regulatory frameworks. Incentives should go beyond just policies and focus on tangible rewards for developers and investors who engage in sustainable practices (e.g., tax benefits, fast-track permits for green-certified developments).

Simplify Green Finance Tools → Green mortgages and retrofitting subsidies need to be easier to access. Streamlining the application process will make green finance products more appealing to a broader range of buyers and developers, especially those with smaller budgets.

Strengthen Public Communication Campaigns → Government and municipal bodies should launch nationwide campaigns aimed at raising awareness about the financial and environmental benefits of green real estate, with a focus on how EPC ratings and green mortgages can impact long-term costs and value.

Offer Local-Level Green Incentives → Local governments, especially in Lisbon, should implement city-specific incentives that encourage small-scale property owners to engage in energy-efficient retrofits, thereby extending the benefits of green finance to more communities.

B. For Developers and Financial Institutions

Integrate Sustainability into Core Project Strategies → Developers should embed green certifications and energy-efficient features into all stages of the project lifecycle—from design to marketing. Sustainability should be a central selling point rather than an afterthought.

Create More Green Financing Products → Financial institutions should collaborate with developers and the government to create more accessible green loans and green mortgages tailored for a wider range of property types, including mid-range residential developments and public housing.

Support Public-Private Partnerships → Developers and financial institutions should work closely with municipal governments and EU funding mechanisms to scale up sustainable urban projects and make green finance accessible to a wider demographic, particularly in affordable housing markets.

C. For Real Estate Professionals

Educate Buyers and Sellers About Green Real Estate → Real estate agents must assume the role of educators by informing clients about the long-term benefits of green-certified properties, including lower energy costs, better financing terms, and higher resale value. Incorporating sustainability into their consultations will help normalize the importance of energy-efficient properties.

Advocate for Green Features in Every Transaction → Real estate professionals should make green certifications a standard feature in property listings and presentations, encouraging clients to consider sustainability as a core part of the buying process, not just a luxury option.

Build a Network of Sustainability Experts → Professionals should establish partnerships with environmental consultants, financial advisors, and green mortgage providers to offer clients a full spectrum of services that include sustainable financing options and energy-efficient solutions.

Adopt Green Practices in Business Operations → Real estate agencies and professionals can lead by example, adopting green practices in their offices, operations, and marketing materials to align their business operations with the values they promote in the market.

D. For Future Researchers

Conduct Longitudinal Studies on Green Premiums → Further research is needed to track the long-term impact of green certifications on property values, rental yields, and investor returns, particularly in the context of economic downturns and policy changes.

Explore Consumer Behavior and Sustainability Preferences → Studies examining how consumer psychology affects the adoption of green features and green financing options will help real estate professionals and policymakers better understand the factors influencing sustainability in real estate markets.

Comparative Studies Between Developed and Emerging Markets → Future research could explore the differences in green real estate adoption between mature markets (e.g., Portugal, Germany) and emerging markets (e.g., Iran), highlighting barriers and opportunities for green finance in diverse socioeconomic and cultural contexts.

6.3 Final Reflection

This dissertation successfully achieved its objective of exploring the influence of green finance tools on real estate value and buyer behavior within the Lisbon Metropolitan Area. The rigorous analytical framework, which integrated proprietary market data (as detailed in Appendix A) with professional field observations, provides a crucial dual perspective on the market's current state, systemic challenges, and future direction.

The empirical evidence, particularly the confirmed financial premium associated with higher Energy Performance Certificate (EPC) ratings, decisively supports the core argument that sustainable real estate practices translate into measurable financial value. Furthermore, the analysis highlighted a critical market disconnect, termed the visibility gap, between consumer interest in energy performance and the low adoption rate of dedicated green financing mechanisms. This finding underpins the conclusion that while institutional readiness is progressing, its practical impact is constrained by cultural inertia and an intermediary communication failure.

The body of work, therefore, is intended to serve as a foundational contribution to the evolving literature on urban sustainability and financial integration in Southern Europe. The specific findings and market-based recommendations offer valuable input for:

Polymakers: Informing strategies for effective implementation of the EU Taxonomy and strengthening incentive programs.

Financial Institutions: Guiding the development and promotion of targeted, user-friendly green financial products.

Real Estate Professionals: Establishing their critical role as translators of abstract sustainability metrics into tangible financial benefits for clients.

By providing a clear mapping of the market's challenges and opportunities, this research advocates for a more sustainable, equitable, and resilient real estate market in Lisbon and beyond. It is anticipated that the comprehensive findings and structured recommendations presented here will contribute meaningfully to policy and practice, setting the stage for subsequent research to track the market's continued evolution and the efficacy of the proposed interventions.

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APPENDIX A – DATASETS AND SUPPORTING MATERIAL

This appendix provides the datasets, summary statistics, methodological notes, and supporting documentation used for the quantitative analysis in Chapter 4. All information follows confidentiality requirements established with Zome and complies with Lusíada University standards for documentary and secondary-data research.

Appendix A.1 – Datasets (Supporting Material)

Formal Statement on Data Availability

The datasets intended for inclusion in Appendix A are not reproduced here due to institutional restrictions, licensing limitations, or because the data are natively hosted on the platforms from which they were sourced.

All datasets used in this dissertation—including market indicators, green financing statistics, mortgage performance data, and energy-efficiency classifications—are fully cited within the methodology and data analysis chapters. Each dataset remains accessible via the official sources listed below:

- **INE – Instituto Nacional de Estatística** (public microdata tables)
- **Eurostat** (EU-level comparative indicators)
- **Banco de Portugal** (financial and mortgage data)
- **IDEALISTA / Casa.Sapo** (market price evolution datasets)
- **ZOME Internal Database** (transactional and listing-level data)
- **CMVM & Euronext** (sustainable finance and bond issuance data)

Should the academic committee require direct data samples, extracts can be provided upon request in compliance with institutional access policies.

Appendix A.2 – Supporting Documentation

This appendix contains the reference material used in the methodological and interpretative sections of Chapters 2 and 4.

Appendix A.2.1 – EU Taxonomy Technical Screening Criteria (Housing Sector – Summary)

Objective	Technical Criterion (Summary)	Relevance for Housing
Climate Change Mitigation	Primary energy demand below national NZEB thresholds; deep renovation achieving $\geq 30\%$ improvement	Determines eligibility for green financing and tax incentives
Climate Change Adaptation	Climate-risk vulnerability assessment	Required for sustainable investment classification
Circular Economy	Use of sustainable materials and waste reduction	Influences new developments and renovation eligibility

Source: European Commission (2020, 2022 updates).

Appendix A.2.2 – EPC Rating Classification (Portugal)

EPC Rating	Typical Energy Use (kWh/m².year)*	Characteristics	Market Implications
A	< 50	High efficiency, insulation, modern HVAC	Highest premiums
B	50–100	Good insulation, updated systems	Positive perception
C	100–150	Standard efficiency	Neutral pricing
D–F	>150	Low insulation, older systems	Longer DOM, discounts

*Approximate values; ranges vary by building typology and regulation updates.

Source: SCE – Sistema de Certificação Energética.

Appendix A.2.3 – Extracts from Primary Documents

Included materials:

- Excerpt from SCE national EPC guidance (2023 edition)
 - Extract from EU Taxonomy delegated act (2022 update)
 - Idealista and INE screenshots with methodological notes
 - Summary table of PRR (Plano de Recuperação e Resiliência) incentives for energy renovation
-

Appendix A.3 – Confidentiality Note

The raw Zome dataset used in this dissertation contains confidential and commercially sensitive information. It is therefore not publicly distributable.

The anonymized and aggregated data presented in Appendices A.1 and A.2 were authorized for academic use and meet all confidentiality requirements.

The full anonymized dataset may be made available to the supervisor upon request.