

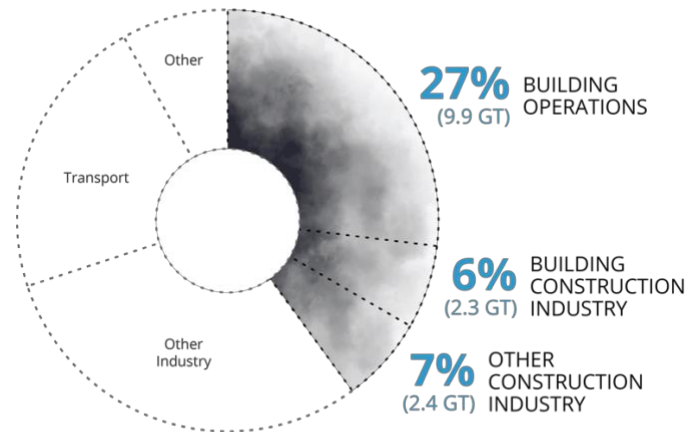
CHAPTER I

INTRODUCTION

1.1 Research Background

The building sector is a major contributor to environmental problems, posing a significant challenge for the industry. As per the International Energy Agency (IEA), buildings have a substantial impact on global CO₂ emissions. It's quite significant when considering all the activities that occur within buildings daily like maintaining warmth, coolness, and lighting which collectively contribute to a substantial 27% of global CO₂ emissions. Construction activities also play a part. The building construction industry alone contributes 6%, while other construction sectors add another 7% annually to global CO₂ emissions. Taking a broader view, buildings are major consumers of energy, accounting for a significant 30% of the world's energy supply. However, this energy consumption comes with a significant environmental cost. Buildings are responsible for a considerable portion – 26% – of global energy-related emissions. This includes 8% directly from building operations and another substantial 18% indirectly from producing the electricity and heat needed to power buildings(IEA, n.d.).

Annual Global CO₂ Emissions



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Building Construction Industry and Other Construction Industry represent emissions from concrete, steel, and aluminum for buildings and infrastructure respectively.

Figure 1.1 Annual Global CO₂ Emissions

Source: Architecture 2030, IEA (2022)

Indonesia's building sector is responsible for 4.6% and 24.5% of the nation's total energy-related greenhouse gas emissions as of 2021, both through direct and indirect emissions (*World Energy Outlook 2022*, 2022). The residential sector stands out as a major player in global energy consumption, guzzling up a surprising 27% of the world's energy. That's a massive chunk, enough to power homes worldwide. Plus, this sector carries a hefty environmental footprint, responsible for about 17% of the world's greenhouse gas emissions. But here's the thing: the impacts of this energy use and emissions extend far beyond just houses (Payam Nejat et al., 2015). When broadening the scope to encompass both residential and commercial spaces, the energy usage rate jumps to a notable 40%. This underscores the crucial role of the building industry in the global energy landscape, emphasizing the urgency of discovering methods to enhance its effectiveness and mitigate its ecological footprint. In the building sector, emissions per person are actually less than half of the G20 average. These emissions can come from burning fuels directly for cooking and heating, or indirectly from using grid power for appliances and air conditioning. As of 2021, the emissions per

capita related to buildings are less than half the G20 average. However, while the G20 average is slightly dropping, Indonesia's per capita building emissions surged by 52% between 2016 and 2021, starting from a very low base(*World Energy & Climate Statistics 2023, 2023*).

Buildings sector emissions per capita

incl. indirect emissions (tCO₂/capita) in 2021



Source: Climate Transparency Report Indonesia (2022)

Figure 1. 1 Building Sector Emissions Per Capita 2021

Indonesia's current climate change policy, as laid out in its unconditionally determined contribution (NDC), falls short of halting global warming at 1.5°C. If this plan goes ahead as proposed, emissions are set to increase significantly, reaching 421% of the emissions level seen in 1990, or around 1,661 million tonnes of CO₂ equivalent (MtCO₂e), by 2030. Excluding the land use, land-use change, and forestry sectors, Indonesia would need to limit emissions to approximately 449 MtCO₂e by 2030 to stay on track with the 1.5°C target. This leaves a substantial "ambition gap" of nearly 1,212 MtCO₂e(*World Energy & Climate Statistics 2023, 2023*). Closing this gap and achieving the required carbon reductions would require significant effort and dedication from Indonesia. One of the initiatives aimed at enhancing energy efficiency is the government's target of achieving Net Zero Emissions (NZE) by 2060 or earlier, as outlined in the Long

Term Strategies for Low Carbon and Climate Resilience 2050 (LTS-LCCR 2050)(Zhiua Ding et al., 2018).

The Indonesian government is actively promoting sustainable building practices nationwide. One major focus area is Zero Energy Buildings (ZEBs). Leading this effort is the Ministry of Public Works and Public Housing (PUPR), specifically through its Directorate General of Cipta Karya. A recent initiative involved a book discussion titled "Towards Zero Energy Buildings in Indonesia" (Menuju Bangunan Zero Energy di Indonesia). This effort to raise awareness reflects the government's broader commitment to educating stakeholders in the construction industry about ZEBs. By informing both professionals and the public about the advantages and feasibility of ZEBs, PUPR aims to drive wider adoption of these practices and contribute to a more sustainable future for Indonesia's building sector. Moreover, the government is setting ambitious targets for green housing, indicating its commitment to sustainable development(ManadoPost.id, 2023). Under the ASEAN Chairmanship forum, initiatives like "Developing Energy Efficient Mortgage in ASEAN Region," led by the Ministry of Finance and PT Sarana Multigriya Finansial (SMF), underscore a commitment to green housing financing. This joint endeavor aims to create a framework that simplifies the process for Indonesians to secure financing for eco-friendly homes. With the government's ambitious goal of constructing 1 million subsidized green homes by 2030, collaboration with stakeholders in the financial and construction sectors is crucial. Together, they aspire to transform this vision into tangible progress for a more sustainable future(PUPR.id, 2023).

In 2023, the Indonesian Ministry of Public Works and Public Housing (PUPR) rolled out a program with an ambitious goal: constructing 1 million subsidized green houses by 2030. This initiative aimed to tackle the pressing need for affordable housing while also championing eco-friendly practices. The focus was on creating homes that not only offered accessibility but also integrated sustainable features, potentially lessening their environmental impact. This government-led effort reflects a growing trend towards sustainable development

in the housing sector, striking a balance between affordability and environmental consciousness. Central to this initiative is the Green Subsidized Housing program. These homes are priced the same as regular subsidized houses, at Rp. 166,000,000, making them an appealing choice for low-income individuals seeking both sustainability and affordability in their housing. The Green Subsidized Housing program has garnered positive feedback from both the public and private sectors alike (medcom.id, 2023). Developers are rallying behind the program, showing their full support, and many have already started integrating green features into their designs. To encourage this trend, the government is offering incentives to developers who embrace green housing, such as tax breaks and subsidies. It's a move aimed at curbing the environmental impact of construction activities, ultimately helping to safeguard our natural surroundings. Achieving energy efficiency demands a series of actions aimed at reducing carbon emissions. This includes opting for renewable energy sources, designing energy-efficient buildings and appliances, and cultivating energy-saving habits in our daily lives. It's all part of the government's broader efforts to foster sustainability and protect our environment for generations to come.

This national commitment underscores the urgent need for companies across all sectors, especially in the housing industry, to prioritize environmental responsibility. One key solution to address the significant environmental footprint of the building industry is the adoption of sustainable development principles, commonly referred to as "Green Building." This approach involves integrating sustainable practices throughout the entire lifecycle of a building, from initial planning and construction to ongoing maintenance and eventual dismantling. Green buildings are designed not only to minimize environmental impact but also to enhance the health and well-being of occupants while remaining financially viable. By prioritizing economic viability, occupant health, and environmental responsibility, green construction offers a holistic strategy to reduce the environmental footprint of the building sector and pave the way for a more sustainable future. Green homes are designed to be more than just environmentally

friendly; they're built to create a comfortable, healthy living space while minimizing their impact on the planet. Several key features contribute to this goal. One important aspect is improved insulation and sealing. High-performance windows and superior insulation in walls, floors, and ceilings keep the home comfortable year-round. This not only enhances occupant comfort but also reduces energy consumption for heating and cooling, leading to lower energy bills and a smaller environmental footprint. Green homes often incorporate energy-efficient systems to further reduce their environmental impact. Heat pumps provide efficient climate control, while energy-star certified appliances and LED lighting minimize overall energy usage. Additionally, many green homes take advantage of renewable energy sources like solar panels to generate clean electricity and power the home, reducing reliance on traditional energy sources. Water conservation is another key feature of green homes. Water-efficient fixtures and appliances help minimize water use, while rainwater harvesting systems capture rainwater for irrigation or other non-potable needs. This not only reduces strain on municipal water supplies but also saves money on water bills. Green homes go beyond energy and water efficiency to prioritize the health and well-being of their occupants. Advanced filtration and ventilation systems improve air quality and humidity within the home, creating a healthier living environment. Additionally, green homes often prioritize recycled or non-toxic building materials to reduce environmental impact and promote occupant well-being. Finally, green homes look towards the future by incorporating features that encourage sustainable transportation choices and climate resilience. Secure bicycle storage and dedicated electric vehicle charging stations make eco-friendly transportation more convenient. Additionally, features like fire-resistant cladding, emergency backup systems for extreme weather events, and hurricane-resistant shutters can protect the home from potential damage (Royal Bank, 2024).

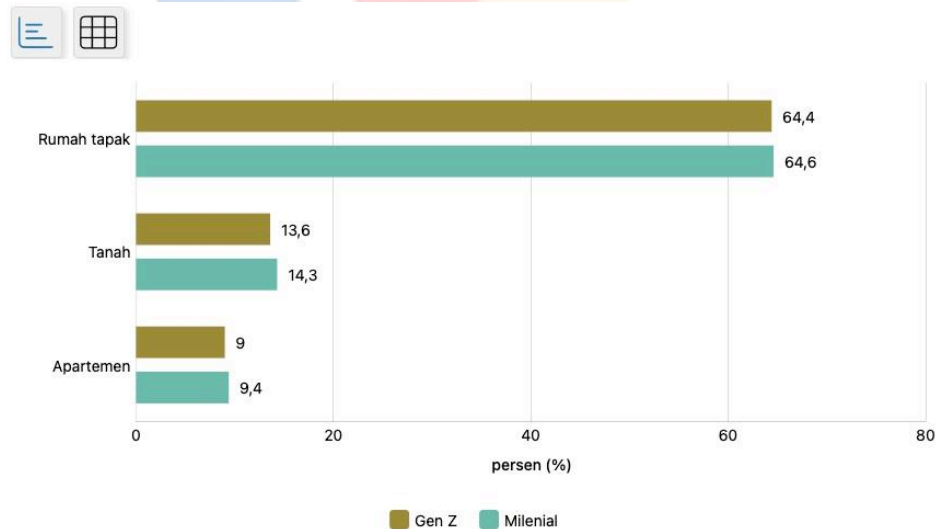
A contributing factor is public awareness, as rising environmental concerns fuel the need for sustainable living options, such as green residential buildings. Furthermore, green buildings offer long-term financial advantages to both

homeowners and developers. Their economic attraction is further enhanced by the possibility of higher property prices, which translates into cheaper operating costs due to their energy and water efficiency (*Science Daily*, 2023). With this diverse strategy, Indonesia is positioned as a potential participant in the global green construction movement. The Green Building Council Indonesia (GBCI) created the Green Building Rating System (GRBS), which offers a framework for evaluating and approving a building's sustainability performance (*Green Building Council Indonesia*, 2013). There has been an increasing dedication to sustainable construction standards in Indonesia, as seen by the approximately 1,400 structures that have obtained GRBS certification as of 2023 (*Green Building Council Indonesia*, 2023). A number of variables are combining to provide an attractive growth trajectory for the green construction landscape in Indonesia. Government programmes are essential; rules and subsidies incentivize developers to design environmentally conscious structures that adhere to strict guidelines (*BAPPENAS*, 2021).

Green building is not just for business buildings; it also applies to residential buildings. With a focus on sustainable development and environmental issues, these "Green Residentials" were created especially. They include features—often focusing on energy-saving technologies—that make effective use of the home's resources to reduce environmental pollution. This strategy is especially important in Indonesia, where the country's rapidly expanding metropolitan area has put a strain on its resources and infrastructure. In order to maintain communities' long-term sustainability and well-being, it is now imperative to support the construction of ecologically suitable homes. In addition to giving occupants comfortable, resource-efficient living quarters, these green homes present a viable way to lessen the housing sector's negative environmental effects (Aca Sughandy & Rustam Hakim, 2007).

Millennials, the generation born roughly between the early 1980s and late 1990s, are a crucial demographic in Indonesia's housing market. This tech-savvy, environmentally conscious generation is increasingly prioritizing sustainability in

their purchasing decisions. Understanding the factors influencing their willingness to choose green residential buildings is essential for promoting widespread adoption. Millennials grew up witnessing the environmental consequences of past practices. Climate change, pollution, and resource depletion are pressing issues that have shaped their values and priorities. They are more likely to be concerned about the environmental impact of their choices and actively seek solutions that promote a sustainable future. A 2023 study by 99 Group indicates a strong interest in landed homes among millennials, with 64.6% expressing this preference. However, this environmentally conscious generation is also increasingly aware of sustainability issues, suggesting a potential shift towards green residential construction. While green homes might not be the dominant housing type currently, their focus on sustainable design, low carbon footprint, and energy efficiency could hold significant appeal for millennials. This trend signifies the potential for green building practices to gain traction in the Indonesian housing market, particularly as millennials become a more prominent force in the homebuying demographic (databoks, 2023).



Source: Katadata Media Network, Databoks

Figure 1. 2The most sought-after type of property among Gen Z and millennial generations in Indonesia as of the first half of 2023.

Millennials, a generation defined by digital fluency, social consciousness, and growing purchasing power, are uniquely positioned to drive positive change towards sustainability. This influential demographic, estimated to comprise roughly 23% of the global population [MSCI, 2020], holds significant market power that could shape future housing trends, particularly the adoption of sustainable living practices. This study delves into the motivations behind millennials' desire for environmentally friendly homes in Indonesia. Green buildings, designed and constructed with sustainability in mind, offer a promising solution to meet this demand. However, understanding what truly compels consumers, particularly millennials, to choose these homes is crucial for widespread adoption of green residential buildings.

Buying green residential structures is influenced by a complex interaction of factors outside an individual's environmental consciousness. A framework for comprehending these influences is provided by the Theory of Planned Behaviour (TPB). The TPB states that behavioural intention is shaped by three main constructs: Attitude towards the behaviour, subjective norm, and perceived behavioural control (Ajzen, 1991a). These TPB constructions offer insightful information about what motivates the Millennials to buy green buildings. However, it's crucial to recognize the additional role of government incentives. Governments can influence consumer behaviour through policies and financial incentives promoting green buildings. Studies suggest that these incentives have a broad impact, even though research specifically on how they affect millennials in Indonesia is limited. For example, a Chinese study examining young consumers' purchase intention for green housing found that government incentives, positive attitudes, and societal pressure were the most significant factors, highlighting the potential effectiveness of targeted initiatives. While more research is needed on how government incentives influence Indonesian millennials, existing studies offer valuable insights. (Zhang et al., 2018).

Understanding millennials' decision-making process regarding green residential buildings holds significant economic and environmental benefits. From

an economic standpoint, these insights can empower developers to tailor their marketing strategies and product features to resonate with this influential demographic. This, in turn, could lead to a surge in the adoption of sustainable residential practices and contribute to the growth of Indonesia's green construction sector. Environmentally, encouraging millennials to choose green homes can lead to a reduction in energy consumption, carbon emissions, and the overall environmental footprint of the housing sector. This aligns with Indonesia's national sustainability goals and paves the way for a cleaner future for generations to come.

1.2 Scope of Research

This research aims to gain a comprehensive understanding of the factors influencing millennials' decision-making regarding green residential buildings in Indonesia. It will explore four key areas: attitudes (environmental benefits, cost implications, value alignment, and aesthetics), subjective norms (social pressure from family, friends, and society), perceived behavioural control (financial limitations, information access, feature complexity, and availability), and government incentives. By focusing on these factors, the research will provide valuable insights into what motivates millennials to choose (or not choose) green residential buildings. This knowledge will be instrumental in informing marketing strategies, developing targeted initiatives, and ultimately promoting the adoption of sustainable living practices among millennials in Indonesia.

1.3 Research Question

This research investigates the factors influencing millennials' decisions to purchase green residential buildings in Indonesia, with a particular focus on the moderating role of government incentives. Green residential buildings are dwellings designed and constructed with sustainability in mind, minimizing environmental impact. The study explores how attitudes, social pressures, and perceived ease of acquisition influence millennials' purchase intention of green buildings. It further investigates how government policies and financial incentives

promoting green buildings might moderate the relationship between these primary factors and purchase intention.

Understanding these factors and their interactions is crucial for developers and policymakers. Even if millennials prioritize environmental factors, social pressures or perceived difficulties in acquiring green buildings can deter them. This research can inform targeted strategies to bridge this gap. By examining how attitudes, social norms, perceived control, and government incentives as a moderating variable influence purchase intention, the research aims to identify how to effectively communicate the benefits of green buildings and empower millennials to make environmentally conscious housing decisions. The following inquiries are the focus of this study:

1. How does attitude influence the purchase intention of green residential buildings among millennials in Indonesia?
2. How does subjective norm influence the purchase intention of green residential buildings among millennials in Indonesia?
3. How does perceived behavioural control influence the purchase intention of green residential buildings among millennials in Indonesia?
4. How does government policies and financial incentives moderate the relationship between attitude, subjective norms, perceived behavioural control and millennials' in Indonesia purchase intention of green residential buildings?

1.4 Research Objectives

Based on the scope of the problem in this research, the following benefits can be formulated:

1. To analyse the influence of attitude on the purchase intention of green residential buildings among millennials' in Indonesia.
2. To analyse the influence of subjective norm on the purchase intention of green residential buildings among millennials' in Indonesia.

3. To analyse the influence of perceived behavioural control on the purchase intention of green residential buildings among millennials' in Indonesia.
4. To analyse how the government policies and financial incentives promoting green buildings moderate the relationships between Indonesian millennials' attitude, subjective norms, perceived behavioural control, and their purchase intention of green residential buildings.

1.5 Research Benefits

This research on the impact of various factors on millennials' purchase intention for green residential buildings in Indonesia has the potential to offer a range of benefits:

- a. For the researcher: This research offers the researcher a chance to develop valuable research skills through methodology, data analysis, and critical thinking. The findings will contribute significantly to understanding green building adoption among Indonesian millennials, informing stakeholders on how to promote sustainable living practices within this demographic. Additionally, the research builds expertise in both sustainability principles and consumer behaviour, valuable for addressing the challenges of sustainable development. Finally, publishing the findings can enhance the researcher's professional profile and offer personal fulfilment by contributing to a more sustainable future..
- b. For the government: This research offers valuable insights for policymakers aiming to promote sustainable housing practices among millennials in Indonesia. The findings can inform the development of targeted policies that address the factors influencing millennials' decisions regarding green residential buildings. This may include government incentives, financial assistance programs, or regulations that incentivize green building development. By understanding how attitudes, social norms, perceived ease of acquisition, and government incentives influence millennials, policymakers can allocate resources efficiently and make evidence-based decisions to

promote green building adoption. The research can also inform public awareness campaigns that resonate with millennials' values and concerns. Ultimately, this research empowers the government to play a crucial role in fostering a more sustainable future for Indonesia's housing sector and encouraging millennials to choose green living options.

- c. For Society: This research offers benefits to society by raising awareness and encouraging the adoption of green buildings, which can improve quality of life, create jobs, protect the environment, and build a more sustainable future. The findings can help homebuyers make informed decisions, investors identify opportunities in the growing green building sector, and citizens contribute to environmental preservation
- d. For future research: This research lays the groundwork for future studies exploring the adoption of green buildings among millennials in Indonesia. Future research endeavours could broaden the scope by examining millennials from various backgrounds within Indonesia or across different countries. Longitudinal studies tracking how millennials' attitudes and purchasing behaviour evolve over time could offer even richer insights. Additionally, future research could delve deeper into the effectiveness of specific interventions designed to influence millennials' green building choices. Examples include financial incentives, educational programs, or innovative marketing campaigns. By exploring these complementary areas, researchers can gain a more comprehensive understanding of green building adoption among millennials and inform the development of even more effective strategies for promoting sustainable housing practices within this key demographic..