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# **Green Investment in the Age of Digital Transformation in Vietnamese Enterprises**

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## **ABSTRACTS:**

Green investment is the process of making investment decisions based on environmental protection criteria, to create a positive impact and at the same time ensure stable financial income from investment projects. Globally, most countries are focusing on focusing on sustainable development goals by promoting green growth, green finance and green investment. Vietnam is no exception when it comes to paying special attention to encouraging green investment. Development opportunities from green investment are huge for businesses, banks and the whole country. Besides, in the current 4.0 context, with the rapid development of information technology, digital transformation has become an essential factor. The combination of green investment and digital transformation is the key to building a sustainable and prosperous future for the country.

**Keywords:** green investment, green growth, green finance, digital transformation

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## **1. INTRODUCTION**

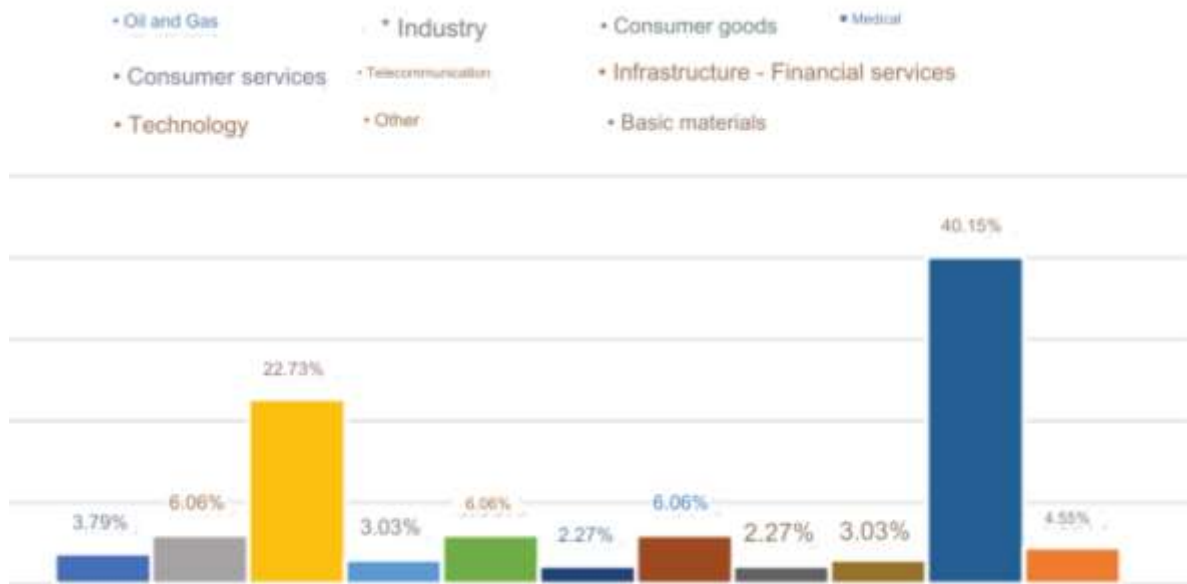
Vietnam, with its special terrain and sensitivity to extreme weather phenomena, often faces serious impacts from natural disasters, storms, floods, and tropical depressions. These events not only have major consequences for the economy and people's daily lives, but also highlight concern for the living environment. Besides, economic development cannot take place without affecting our living environment. In the process of attracting foreign investment and building factories, we are having to make many trade-offs, especially concerns for the environment. This not only leads to air pollution, but also increases the severity of climate change. For example, recently, Hanoi has continuously ranked among the top cities with the highest air pollution in the world. To cope with this situation, the government and state have been shifting the economic model to green growth and green economy. In this strategy, 'green investment' plays an important role as a key to promoting economic regeneration, effectively utilizing natural resources, minimizing greenhouse gas emissions, and responding to Be positive about climate change. At the same time, green investment also plays an important role in reducing poverty and creating conditions for the country's rapid, effective and sustainable economic development.

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## **2. RESEARCH METHODS**

### *2.1 Research data*

The research was conducted by collecting data from a survey of 210 businesses in Vietnam. These businesses operate in many different industries and sectors. The survey objective is to assess whether businesses are interested in (i) green investment; and (ii) sustainable development. Surveyed businesses were classified according to business industry criteria.

**Figure 1: Structure by business sector of the enterprise**

Source: Many authors

In addition to primary information, research, analysis, and evaluation of green investment for sustainable development of businesses combined with secondary information. Secondary information is gathered from reliable data sources in policy studies and survey research of reputable organizations such as the United Nations Development Program (UNDP), the Global Green Growth Institute (GGGI), Global Environment Facility (GEF), Korea International Cooperation Agency (KOICA), Asian Development Bank (ADB), United States Agency for International Development (USAID), World Bank (WB).

## 2.2 Variables and research model

To evaluate the level of interest of businesses in green investment for sustainable development, factors affecting green investment for sustainable development of businesses are analyzed and evaluated. These factors are separated into two groups: (i) Group of factors belonging to the sustainable development of the enterprise; (ii) Group of factors that belong to businesses' green investment choices.

To analyze and evaluate these factors, the research model will use statistical methods and multivariate regression models. Models will be built based on survey results and secondary data, with the goal of assessing the influence of factors on businesses' decisions and behaviors related to green investment and development. sustainable development.

In addition, the research method will also use multivariate analysis techniques such as factor analysis, path analysis, and correlation structure analysis to better understand the relationship between factors and effects. their impact on corporate green investment. This helps create a comprehensive view of the impact of factors on business decisions and behavior in the field of green investment and sustainable development.

### 2.3 Factors affecting green investment of businesses in Vietnam

**Table 1: Factors affecting green investment of businesses**

TT	Survey	Mandarin close	Mean	Standard deviation	Min	Max
1	Green investment is investing in fields?				1	5
1.1	Providing environmental goods and services	200	3.220000	0.988		
1.2	Wastewater treatment	204	3.686275	1.002		
1.3	Protect ecosystem diversity	204	3.686275	0.920		
1.4	Protect the diversity of natural landscapes	202	3.613861	0.997		
1.5	Prevent and minimize damage to the lips environment and climate	204	3.784314	0.958		
1.6	Energy saving	204	3.725490	0.943		
1.7	Renewable energy	196	3.571429	0.917		
2	Sources of capital businesses access to finance green investment activities, satisfaction level?				1	5
2.1	Equity capital	160	3.125000	0.844		
2.2	Loans from partner businesses	122	2.639344	1.060		
2.3	Capital from issuing green fund bonds	118	2.728814	1.122		
2.4	Commercial bank loans	126	2.650794	0.982		
2.5	Other	34	2.705882	1.142		
3	How do businesses evaluate incentives for green investment activities when accessing them? loans				1	5
3.1	Preferential capital value	148	3.121	0.840		
3.2	Preferential loan interest rates	150	3.226	0.795		
3.3	Loan term incentives	144	3.194	0.795		
3.4	Simplicity in loan documents	146	3.123	0.812		
3.5	Simple loan process	142	3.169	0.872		
3.6	Document processing time is quick	148	3.202	0.856		
3.7	Absolute support from banks and organizations credit position	152	3.250	0.991		
3.8	Other	30	2.933	0.944		
4	How do businesses evaluate the difficulties in accessing loans to finance operations? green investment				1	5
4.1	Proof of green investment project	166	3.024096	0.866563		
4.2	Loan value	154	3.090909	0.902890		
4.3	Interest rates	152	3.039474	0.788003		
4.4	Loan term	152	3.013158	0.805501		
4.5	Loan documents	148	3.054054	0.855425		
4.6	Loan application processing time	152	3.131579	0.851055		
4.7	Loan process	146	3.013699	0.838606		
4.8	Other	36	2.923077	0.744208		
5	What is the capital source that businesses aim to finance green investment projects?				1	5
5.1	Equity capital	158	3.189873	0.799298		
5.2	Loans from partner businesses	122	2.590164	0.968548		
5.3	Commercial bank loans	130	2.784615	0.923296		
5.4	Other	36	2.888889	1.115547		
6	How do businesses evaluate the Government's policy to support green investment development?				2	5
6.1	Full support regulations and policies	168	3.142857	0.744527		
6.2	Clarity and transparency of content	166	3.337349	0.842466		
6.3	Coordination in management and supervision activities of relevant agencies	164	3.231707	0.722959		
6.4	Diverse capital sources (Banks, Investment Funds...)	162	3.296296	0.746744		
6.5	Special incentives specifically for green investment activities	166	3.349398	0.686382		
6.6	Other	34	3.411765	1.047874		
7	How do businesses evaluate the Bank's policy to support green investment development?				1	5
7.1	There is a separate source of capital to support green investment	168	3.202381	0.800894		
7.2	Information to customers is clear and transparent	168	3.238095	0.767905		
7.3	There is support in helping businesses confirm green investment plans, green projects...	166	3.216867	0.747492		
7.4	There are preferential interest rates	166	3.349398	0.785223		
7.5	There are incentives for processing time Other	162	3.185185	0.805434		
7.6	Other	38	3.388421	1.100885		

Source: Compiled by the authors

Based on the survey results, it can be seen that the level of satisfaction of businesses with accessing capital to finance green investment activities is at a low average level. This shows that businesses are having difficulty accessing capital to make green investments towards more sustainable development.

Sources of capital accessed from partner businesses, issuing green bonds/green funds, and borrowing capital from commercial banks have quite similar survey results. However, the issuance of green bonds in Vietnam is still very limited and almost no green bonds have been successfully issued for green investment activities.

Groups of factors affecting businesses' green investment mainly focus on access to capital and the Government's supportive policies in this regard, with an average value ranging from 3.5 to 4.0. This demonstrates the need for transparency in specific incentives for green investment as well as the need to establish policies to support interest rates and capital access time for businesses with green investment activities.

Although the standard deviation values vary with a wider range due to the use of a scale from 1 to 5, when compared relatively, these values fluctuate quite similarly to each other, showing diversity in awareness of businesses about green investment activities.

### 3. THEORETICAL BASIS

#### 3.1 Green investment concept

Green Investing is defined in many different ways. To put it simply, green investment is investing in projects or companies that focus on protecting the environment and minimizing negative impacts on the ecosystem.

According to the OECD, green investment is a quite broad term, which can be very closely related to other investment terms, such as SRI - socially responsible investing; ESG -environmental, social and governance investing (investment close to the environment, society and governance), sustainable investment, long-term investment or similar concepts (OECD, 2012).

According to Robert et al. (2009), green investment is defined as investing in environmentally good companies/projects such as companies that systematically, comprehensively and successfully reduce environmental impacts by reduce consumption of natural resources, replace harmful substances with less harmful substances and reduce emissions into air, water and soil. Companies/projects try to maximize environmental benefits with innovative environmentally friendly products and services.

According to World Bank 2010, green investment is investment in production, business, and economical use of energy or renewable or alternative materials.

#### 3.3 Forms of green investment

There are 3 main forms of green investment:

- Low emission energy supplies (including renewable energy, biofuels, nuclear).
- Use energy effectively (in the field of energy supply and energy consumption).
- Carbon sequestration (including afforestation and agricultural development).

**Table 1: Structure of green investment forms**

FORMS OF GREEN INVESTMENT	INGREDIENT
1, Low emission power supply	Renewable energy, biofuels, nuclear
	Solar power: Invest in projects that use solar energy, including installing solar panels and building concentrated solar power systems to take advantage of natural energy from sunlight
	Wind energy: Support for the development, construction and operation of wind farms to exploit energy from the wind, while minimizing dependence on fossil energy sources.
	Hydropower: Invest in hydroelectric projects, including hydroelectric plants and small-scale hydroelectric projects, to utilize energy from flowing water.
	Geothermal energy: Funds the development and operation of geothermal power plants, which use heat from the ground to produce electricity.

	<p>Biomass energy: Supports the production and use of energy from biomass sources such as biofuel and biogas, contributing to reducing carbon emissions.</p>
	<p>Clean nuclear energy: Support research and development projects on clean nuclear energy to reduce carbon emissions and ensure safety during production and operation.</p>
<p>2, Use energy efficiently</p>	<p>Energy from ground heat: Invest in technology that uses heat from the ground to produce electricity or provide heat for heating systems, creating a stable and sustainable source of energy from natural resources.</p>
	<p>Efficiency and energy conservation</p>
	<p>Green building: Invest in constructing and equipping buildings with advanced technologies to increase energy efficiency and minimize environmental impact. This includes improving structures and building materials to optimize the use of natural light, temperature management, and the use of renewable energy sources.</p>
	<p>Smart grid technology: Supports the development and deployment of smart grid systems, helping to optimize energy distribution and consumption. This technology allows data collection and analysis to adjust energy production and consumption according to actual needs, thereby reducing waste and enhancing the efficiency of the power system.</p>
	<p>Energy storage solutions: Support for research, development and deployment of energy storage technologies such as batteries and pumped hydropower storage. These solutions help optimize the use of renewable energy sources by storing excess energy for use when needed, minimizing waste and increasing the stability of the energy system.</p>
	<p>Sustainable transportation</p>
	<p>Electric Vehicles: Invest in the development, manufacturing and adoption of electric vehicles and charging infrastructure.</p>
<p>3, Carbon absorption</p>	<p>Public transportation: Invest in the development and adoption of electric vehicles along with expanding and improving the public transportation system, to reduce greenhouse gas emissions and traffic congestion.</p>
	<p>Alternative Fuel Vehicles (AFV): Funds the development and commercialization of alternative fuels such as biofuels and hydrogen, to reduce dependence on fossil fuels.</p>
	<p>Waste management and recycling</p>
	<p>Circular Economy: Invest in businesses that promote resource efficiency and reduce waste through recycling and reuse processes that optimize resource use and minimize impact on the environment. environment.</p>
	<p>Waste-to-energy technology: Support the development and deployment of new technologies that help turn waste into renewable energy sources such as biogas and waste incineration. This not only reduces the amount of waste going into landfills but also creates a source of clean energy.</p>

	Pollution Control: Funding projects and technologies that reduce or prevent pollution in the environment, including the use of air filtration systems and water treatment facilities. This helps protect human health and maintain a healthy and sustainable living environment.
	Sustainable agriculture and forestry

Table 2: Green investment tools

GREEN INVESTMENT TOOLS	FUNCTION
<b>Green Bonds</b>	These are debt securities issued by governments, corporations or financial institutions for the purpose of financing projects that have a positive impact on the environment, such as renewable energy projects or sustainable transportation.
<b>Green Mutual Funds</b>	Are investment funds that attract capital from many different investors to invest in diverse portfolios of green assets, including companies operating in the field of renewable energy and infrastructure projects. sustainable floor.
<b>Exchange Traded Fund (ETF)</b>	Are financial instruments that simulate the performance of a specific index, industry or theme, including indices focused on green investments.
<b>Green Funds</b>	Are private equity and venture capital funds used to provide capital to start-up businesses and engage in environmentally sustainable projects or technologies.
<b>Impact Investing</b>	These are investments made with the intention of creating a measurable social and environmental impact, while ensuring financial returns.
<b>Carbon Credits and Offsets</b>	Financial instruments that allow for the reduction or elimination of equivalent carbon dioxide emissions, which individuals or organizations can purchase to offset their carbon emissions.

### 3.3 Digital transformation in Vietnamese businesses

#### 3.3.1 Concept of digital transformation in businesses

Digital transformation, also known as Digital Transformation, has become an inevitable factor for businesses if they want to grow and not fall behind.

According to Gartner - one of the world's leading information technology research and consulting companies: "Digital transformation is the use of digital technologies to change business models, create opportunities, new revenue and value".

Microsoft believes: "Digital transformation is about rethinking how organizations bring together people, data and processes to create new value."

According to the Ministry of Planning and Investment of Vietnam (2021), digital transformation in businesses is defined as "the integration and application of digital technology to improve business efficiency, management efficiency, capacity and strength." competition of businesses, creating new values". This includes the use of software, applications, information systems, artificial intelligence (AI), big data (Big Data), Internet of Things (IoT), cloud computing (Cloud Computing). ...

#### 3.3.2 Reasons for digital transformation in businesses

The 4.0 revolution is driven by the strong development of technology that has opened up new potentials in production, combining the fields of physics, digital technology and biology. This change not only deeply affects economic, political and social life but also creates new challenges and opportunities for businesses. In the post-Covid era, consumer behavior has become more dependent on the digital environment. Digital transformation is not just a trend but an inevitability of the economy and if businesses do not participate in the digital transformation race, they will face many difficulties and challenges in the future, which can lead to failure.

Digital transformation will help businesses create a competitive advantage over their competitors. This is the benefit and why businesses need strong digital transformation. Digital transformation has become an indispensable part of the development strategy of businesses. This is not only a trend but also a decisive factor for success in an increasingly competitive market.

First, digital transformation helps management make decisions, improving business efficiency. By using digital data from business operations, they can better understand the performance and operations of their businesses. enterprise. Thanks to automated reporting and tracking systems, managers can easily access and evaluate relevant information, helping them make more informed and effective decisions. This creates a transparent and fast working environment, helping to improve the management process and shape the business's development strategy.

Second, digital transformation creates competitive advantages for businesses. In a constantly changing market, applying digital technology helps businesses maintain and improve competitiveness, while taking advantage of new opportunities.

Third, digital transformation also helps optimize business operations. By applying digital technologies, businesses can improve labor productivity, reduce costs and optimize work processes. Digital transformation helps eliminate time-consuming manual work, thereby helping employees focus on their professional work and improve work efficiency. The result of reduced operating costs and process automation is increased revenue for the business. In addition, when a business's services become more flexible and convenient for customers, this will attract more new customers and increase the use of the business's services.

Fourth, Improve product and service quality. Digital transformation allows businesses to operate flexibly anywhere and anytime. Previously, working remotely or handling after-hours issues was difficult because of the lack of necessary documents and equipment. But now, thanks to digital transformation, employees can work remotely with just a computer or mobile phone. This helps ensure that the business's personnel can work anytime, anywhere.

Besides, digital transformation also creates a better experience for customers. By collecting and analyzing customer data, businesses can better understand customer needs and provide appropriate products and services. This helps increase customer satisfaction and loyalty.

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#### **4. CURRENT STATUS OF GREEN INVESTMENT IN THE CONTEXT OF DIGITAL TRANSFORMATION OF VIETNAMESE ENTERPRISES**

##### ***4.1 Current status of green investment in Vietnamese enterprises***

Up to now, investing in green projects at Vietnamese businesses is becoming popular and attracting increasing attention. Businesses increasingly recognize the importance of integrating environmental and social factors into their business strategies.

Support from the Government also plays an important role in encouraging green investment. Tax incentives and financial support policies are applied to create favorable conditions for green projects.

Consumers are increasingly aware of the importance of environmental protection. Their interest in products and services that have a positive impact on the environment has created market pressure, pushing businesses to focus on developing green products and services.

Green business requires businesses' commitment to environmental responsibility. Results of the 2016 Provincial Competitiveness Survey (PCI) show that 87% of businesses know about environmental regulations and are conscious of environmental protection. They are willing to spend a reasonable portion of costs on environmental activities. 35% of businesses said that environmental pollution has a significant impact on their production and business activities, while a few admitted that the current environmental pollution situation has affected their business activities. Surname. However, only about 20% of Vietnamese businesses fully comply with environmental regulations during production and business processes. Conflicts mainly come from small-scale businesses, which have limited funding for environmental treatment, while the costs for this are often high and related regulations are complex. Most businesses apply internal regulations to protect the environment and reduce environmental pollution, including the economical use of raw materials and energy. Some typical businesses following the green investment trend are Vingroup, Vinamilk, and Hoa Sen Group. In addition, typical green projects have attracted great attention from the business community and consumer community. For example, LEGO's first carbon neutral factory in Binh Duong and the La Gan offshore wind power project in Binh Thuan are clear examples of green investment in Vietnam.

##### ***4.2 Benefits of green investment***

Investing in green buildings not only brings benefits to investors and residents but also has many long-term benefits for the social community.

- Climate adaptation and mitigation: Green projects can improve the ability of communities and businesses to adapt to climate change by building flood-proof infrastructure, improving drainage systems and water use. Construction materials resistant to harsh environments. By reducing emissions and promoting the use of renewable energy, green projects also contribute to minimizing human impact on global climate change.

- Flood mitigation: Businesses and communities that invest in green projects can help reduce flood risk by building effective drainage systems and protecting and restoring wetland areas and create green areas that absorb rainwater.

- Improve housing quality and human health: Green projects bring green, clean and beautiful living spaces and improve air and water quality. This helps reduce the risk of respiratory and digestive diseases, enhancing people's spirit and quality of life.

- Enhance labor productivity: A green and comfortable working environment creates a positive and creative working environment, leading to increased labor performance, creativity and commitment of employees.

- Sustainable tourism development: Green projects help develop sustainable tourism by preserving and responsibly exploiting tourism resources, attracting tourists and protecting cultural and natural heritage of locality.

We can see the reality of green investment such as Ecopark green urban areas in Hanoi or Phu My Hung in Ho Chi Minh City, which bring cool green living spaces with systems of parks, lakes and green areas. large area, helping to reduce air and water pollution. Or green construction projects like Deutsches Haus in Ho Chi Minh City are designed with advanced technology, helping to save energy and create a healthy working environment for employees. And renewable energy projects such as Bac Lieu wind power and Long An solar power not only help reduce carbon emissions but also provide clean and sustainable electricity for the whole community.

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## **5. OPPORTUNITIES AND CHALLENGES OF GREEN INVESTMENT IN THE AGE OF DIGITAL TRANSFORMATION IN VIETNAMESE ENTERPRISES**

### ***5.1 Opportunities of green investment***

Opportunities for green investment in Vietnamese businesses are very diverse and potential. Taking advantage of and exploiting these opportunities will help businesses not only develop sustainably but also actively contribute to environmental and social protection. First, global trends and national commitments are creating a favorable environment for promoting green investment. Vietnam, as part of the international community, is witnessing increased awareness and commitment to protecting the environment and promoting sustainable development. This opens a wide door for businesses to seek and implement green projects, not only to meet national requirements but also to participate in the global trend of environmental protection. .

Second, demand from the market and customers is increasing. Consumers, not only in Vietnam but also around the world, are setting high environmental and social requirements and standards for the products and services they consume. This places great pressure on businesses to improve the quality and sustainability of their products and services. Taking advantage of this opportunity, businesses can develop green products and services to meet the growing needs of the market and customers.

Third, the development of technology and innovation also plays an important role in creating opportunities for green investment. Advances in the field of technology bring new and effective solutions for green projects, helping to optimize business operations and minimize negative impacts on the environment. Businesses can leverage new and innovative technologies to develop green solutions and create sustainable value for both business and society.

### ***5.2 Challenges facing green investment***

Besides the opportunities, challenges for green investment in Vietnamese businesses still exist, and require attention and proper response from relevant parties. One of the biggest challenges is that awareness and awareness are still limited for some businesses. Despite increased information and education about green investment, many businesses are still not aware of the important role of integrating environmental and social factors into their business strategies. This lack of awareness can reduce investment and commitment to green projects.

The next challenge comes from the lack of clear policies and legal frameworks. Although there are a number of policies and regulations on green investment, there is still a lack of clarity and transparency in promoting and supporting businesses to implement green investment projects. This makes it difficult for businesses to identify and implement green projects, while also creating risks and uncertainties during the implementation process.

In addition, initial investment costs are also a big challenge. Although investing in green projects can bring long-term benefits, initial investment costs are often higher than traditional projects. This makes many businesses hesitant and difficult in deciding to invest in green projects, especially in a context where business is facing many other pressures and risks.

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## **6. CONCLUSION AND RECOMMENDATIONS**

### ***6.1 Conclusion***

In the context of digital transformation, green investment in Vietnamese businesses plays an important role in promoting sustainable development and creating long-term value for both businesses and society. Integrating environmental and social factors into business strategies not only brings immediate benefits but also ensures future sustainability.

We have seen a significant increase in green investment among Vietnamese businesses, driven by clear benefits such as adapting to climate change, reducing pollution, improving quality of life. , and enhance business performance. However, to make the most of green investment opportunities, businesses need to promote awareness, develop clear policies and legal frameworks, and seek innovative technology solutions. Only through the cooperation and joint efforts of governments, businesses and communities can we achieve a sustainable and prosperous future.



## 6.2 Recommendations

Some recommendations to develop green investment in Vietnamese businesses:

Recommendation 1: Improve awareness and capacity of stakeholders. It is necessary to strengthen education and training programs on sustainable development for investors, businesses and regulatory agencies. Providing knowledge and skills about green investment will help create a more proactive and knowledgeable community in recognizing and taking advantage of opportunities from green investment.

Recommendation 2: Encourage research, investment and development of green technology. The government needs to invest in research and development of green technology, and facilitate cooperation between businesses and research organizations to create effective and advanced solutions for projects. This includes establishing and updating clear and transparent policies and regulations and encouraging green investment through incentives such as tax incentives, financial support and regulatory frameworks.

Recommendation 3: Promote pilot green investment projects. Implementing pilot projects such as wind power and solar energy not only helps verify the feasibility and benefits of green investment but also lays the foundation for sustainable development in the future. More importantly, it is necessary to ensure transparency and effective use of committed capital to ensure the success and sustainability of these projects.

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