Private Sector Development Coupled with the Promotion of Environmental Enterprises in Vietnam in the Context of Green Growth

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Abstract
This article analyzes the relationship between private sector development and the promotion of environmental enterprises in Vietnam in the context of green growth. On the basis of synthesized macroeconomic data for the 2015-2024 period, policy documents on green growth, environmental protection, the circular economy, extended producer responsibility, and the carbon market, the study shows that the private economic sector is not only a driver of growth but also a force capable of transforming environmental pressures into new business opportunities. However, environmental enterprises in Vietnam are still developing below their potential because the environmental services market remains fragmented, technical standards are insufficiently harmonized, compliance costs are high, access to green credit is limited, measurement-reporting-verification data remain inadequate, and the informal sector persists in collection and recycling. The article proposes a framework of solutions, including improving market institutions for environmental services, developing market demand through public procurement and EPR, upgrading green finance, standardizing data, supporting technological innovation, forming environmental enterprise clusters, and promoting linkages between private enterprises and the public sector in waste treatment, wastewater treatment, recycling, energy efficiency, and carbon services projects.

Keywords: private economy; environmental enterprises; green growth; circular economy; EPR; carbon market; green finance.

1. Introduction

Over more than three decades of Doi Moi, the private economy has gradually moved from a supplementary position to a crucial component of Vietnam's socialist-oriented market economy. In the early stage, the private sector was mainly assessed through its capacity to create employment, mobilize social capital, and satisfy consumer demand. In the new development stage, however, this sector must also be evaluated by its ability to generate added value, innovate technologically, participate in global value chains, and contribute to green transformation. This shift makes the topic of environmental enterprises more urgent. Environmental enterprises are not merely firms that treat waste or provide urban sanitation services; rather, they constitute a broader ecosystem that includes recycling, clean water, wastewater, monitoring, environmental consulting, energy efficiency, renewable energy, carbon technologies, eco-design, and data services serving ESG governance.

The context of green growth creates a clear policy paradox. On the one hand, Vietnam needs to maintain high growth rates to raise income, expand employment, and strengthen competitiveness. On the other hand, a growth model heavily dependent on resource extraction, energy intensity, externalized environmental costs, and low waste-treatment capacity is no longer appropriate as export markets, investors, and consumers increasingly apply green standards. In other words, green transition is not a decorative policy objective; it is becoming a market condition. Therefore, developing environmental enterprises within the private economic sector is an important channel through which compliance costs can be transformed into new competitive capabilities.

During the ten-year period from 2015 to 2024, Vietnam maintained a relatively high growth trajectory despite the severe shock of the COVID-19 pandemic and global geopolitical and trade fluctuations. In 2024, Vietnam's economy grew by 7.09%, GDP reached approximately USD 476.3 billion, exports exceeded USD 405 billion, and disbursed FDI surpassed USD 25 billion according to information released in international economic reports. At the same time, environmental pressures increased noticeably: electricity demand continued to rise, coal-fired power still played a major role in power supply, municipal solid waste and plastic waste became policy concerns, and emission-reduction requirements moved closer to fundamental industrial sectors such as steel, cement, and electricity. This was a period in which both market incentives and legal pressures compelled enterprises to restructure how they produce, consume, treat, and regenerate resources.

From an academic perspective, research on the private economy often focuses on improving the business environment, access to credit, innovation, labor productivity, and competitive institutions. Meanwhile, environmental research tends to follow streams of state management, treatment technologies, climate finance, or the circular economy. The gap lies in the insufficient analysis of the two-way relationship between the private economy and environmental enterprises. The private sector is both a source of environmental pressure through production and consumption activities and an actor capable of providing environmental solutions with greater flexibility than the public sector. This article approaches environmental enterprises as a component of the modern

private economy, where profit, social responsibility, and resource efficiency can be connected through appropriate institutional design.

The objective of the article is to clarify the theoretical and practical basis for developing the private economy in association with promoting environmental enterprises in Vietnam in the context of green growth. Specifically, the article focuses on four questions: why environmental enterprises should be considered a pillar of the green private economy; what trends are revealed by the development of the private sector and environmental enterprises during 2015-2024; how institutional, financial, technological, and market barriers constrain development; and what policy package Vietnam needs in order for private environmental enterprises to become an implementing force for green growth rather than merely subjects of environmental compliance.

The article's main contribution is the construction of an analytical framework linking three layers: institutions, markets, and enterprise capabilities. At the institutional layer, green growth policy, the 2020 Law on Environmental Protection, the EPR mechanism, green credit, and the carbon market establish the legal foundation. At the market layer, green orders, emission-traceability requirements, ESG standards, demand for waste treatment, and consumer pressure generate demand for environmental services. At the enterprise layer, technological capacity, data governance, capital-mobilization capability, and value-chain linkages determine the extent to which opportunities can be converted into green productivity. This approach allows environmental enterprises to be analyzed not as a single industry, but as the market infrastructure of green growth.

2. Theoretical Basis and Analytical Framework

The concept of the private economy in Vietnam should be understood more broadly than the registered private enterprise sector. From a statistical perspective, the non-state sector includes the collective economy, the private economy, individual and household businesses. From a development policy perspective, the private economy usually emphasizes domestic private enterprises, household businesses, and non-state investors. Although classifications differ, the common feature is that this sector operates on business autonomy, profit motivation, market responsiveness, and a relatively higher risk tolerance. In green growth, these features become advantages: private enterprises can test new models, respond quickly to customer demand, and search for cost-saving solutions through clean technologies.

Green growth is understood as a process of sustaining economic growth while improving resource-use efficiency, reducing emission intensity, protecting ecosystems, and enhancing social welfare. Unlike the traditional environmental approach, which emphasizes end-of-pipe pollution treatment, green growth places the environment within the production function and the business model. When enterprises save energy, reuse materials, reduce defects and waste, manage emissions, and design products with longer life cycles, environmental costs are no longer an external add-on but become a competitive variable. This is particularly important for Vietnam because the economy is deeply integrated into international supply chains, where requirements regarding carbon, traceability, and socio-environmental compliance are increasingly explicit.

Environmental enterprises are an intermediate link between environmental policy and production-consumption behavior. If the State sets standards but the market lacks enterprises with sufficient capacity to provide monitoring, treatment, recycling, greenhouse gas inventory, or technological consulting services, those standards will be difficult to enforce. Conversely, if environmental enterprises develop but there are no mandatory waste-separation regulations, no reasonable service-pricing mechanism, no extended producer responsibility, and no demand from green public procurement, the market will remain small, fragmented, and vulnerable to competition from low-quality services. Environmental enterprises therefore cannot develop solely on a voluntary basis; they require an incentive structure based on prices, standards, contracts, and legal responsibilities.

The theory of environmental externalities shows that pollution arises when the social costs of production or consumption are not fully reflected in market prices. Policy instruments such as environmental taxes, discharge fees, emission quotas, carbon credits, technology standards, and extended producer responsibility are designed to internalize these costs. In Vietnam, the internalization of externalities needs to proceed gradually in order to avoid shocks to small enterprises, yet the situation in which environmental service prices remain below the cost of standard-compliant treatment cannot continue indefinitely. When prices are incorrect, genuine environmental enterprises are disadvantaged relative to informal or non-compliant treatment activities; as a result, the green market is distorted while society continues to bear pollution costs.

The dynamic capabilities theory of the firm suggests that competitiveness derives not only from existing assets but also from the ability to identify opportunities, reconfigure resources, and learn continuously. Private environmental enterprises in Vietnam need high dynamic capabilities because treatment technologies, technical regulations, data requirements, and financial models change rapidly. A traditional waste-collection enterprise may need to shift toward route-data management, material-stream separation, connection with producers for EPR implementation, and reporting of emission-reduction indicators. An environmental consulting firm can no longer focus only on legal documentation; it must develop capabilities in carbon inventory, emission-reduction roadmaps, product life-cycle analysis, and support for exporters in meeting market requirements.

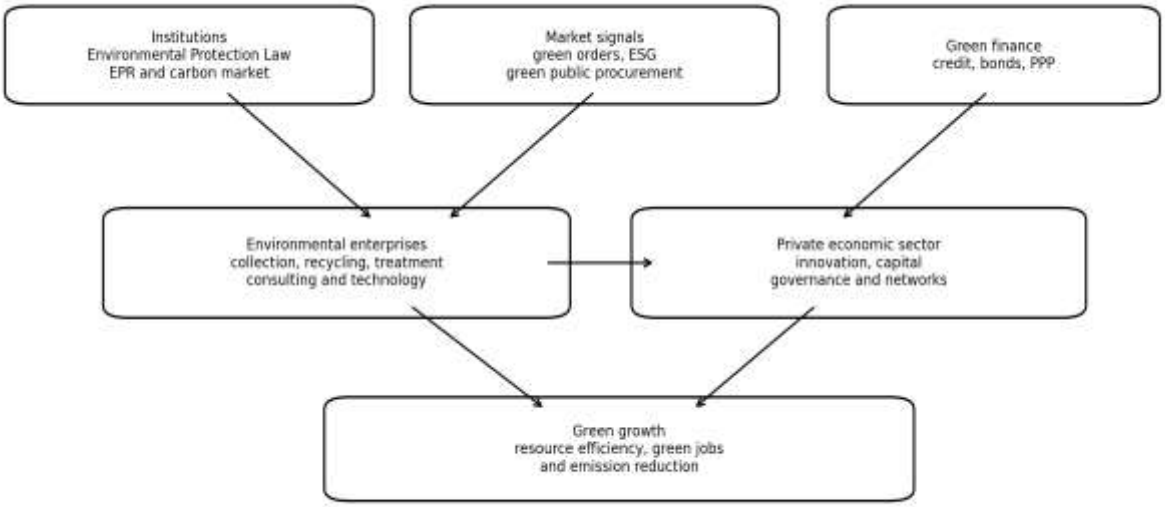
From the perspective of institutional economics, the development of environmental enterprises depends on the quality of property rights, contract enforcement, data transparency, and policy stability. In the waste sector, ownership over waste after generation, collection rights by locality, access to recyclable materials, and fee-payment obligations directly affect investment efficiency. In the carbon sector, ownership of credits, measurement methodologies, recognition of emission-reduction results, and tradability determine whether enterprises dare to invest in emission-reduction projects. Therefore, developing environmental enterprises is not only about providing

capital support; it is also about designing a market with low transaction costs, clear standards, and a reliable dispute-resolution mechanism.

International experience shows that environmental enterprises tend to develop rapidly when three conditions converge. First, environmental regulations are sufficiently strict and have predictable roadmaps so that enterprises can form investment expectations. Second, the market has stable demand through public-service contracts, green public procurement, producer responsibility regulations, and consumer pressure. Third, the financial system has risk-sharing instruments for environmental infrastructure projects, because many projects in wastewater treatment, waste treatment, waste-to-energy, or recycling require long payback periods. Vietnam already possesses part of these three conditions, but their consistency remains limited, causing many environmental enterprises to develop through isolated projects rather than forming a complete environmental industry.

A point that deserves emphasis is that green growth does not imply a reduced role for the private sector; on the contrary, green growth requires the private sector to be upgraded. Private enterprises are where most investment decisions, technological innovation, material choices, energy consumption, and logistics organization take place. If this sector does not transform, green policy will remain on paper. But if the private sector is guided by price signals, supported in accessing finance, connected with technology, and bound by transparent standards, environmental enterprises will become an industry that creates green jobs and raises resource productivity across the whole economy.

Diagram 1. Framework Linking Private-sector Development, Environmental Enterprises, and Green Growth



Source: Synthesized by the author based on the market-institutional approach, circular economy, and green-growth governance.

3. Research Methodology and Data

This article uses qualitative research combined with descriptive analysis of secondary data. Data sources are synthesized from statistical yearbooks, enterprise white books, macroeconomic reports, legal documents, reports of international organizations, policy information, and several reliable economic news sources. The main analytical period is 2015-2024, which reflects a full ten-year cycle, including the growth period before the pandemic, the shock period of 2020-2021, the recovery period in 2022, and the rebalancing period of 2023-2024. Some information after 2024 is used cautiously in the policy context, especially when related to the carbon market or orientations for private-sector development, but it does not change the quantitative data scope of the article.

Vietnam does not yet have a unified official statistical series for environmental enterprises as an independent economic sector. In the system of economic sectors, environment-related activities are dispersed across many fields, such as water supply, drainage and wastewater treatment, waste collection and treatment, recycling, technical consulting, monitoring, renewable energy, energy-efficiency services, and information technology for environmental governance. Therefore, the article does not equate environmental enterprises with a single industry code. Instead, it adopts a functional approach: an environmental enterprise is one that provides products, services, or technologies with the direct objective of reducing pollution, saving resources, regenerating materials, reducing emissions, or helping other enterprises comply with environmental standards.

To ensure caution, the data in the article are divided into three groups. The first group consists of relatively stable macroeconomic data series, such as GDP growth, enterprise size, and the share of the non-state sector. The second group reflects environmental pressures and market signals, such as the power structure, plastic-scrap imports, waste-separation capacity, the EPR mechanism, and the carbon market. The third group comprises qualitative assessments of barriers and policy implications. For the second and third groups, the article prioritizes trends and broad ratios rather than highly detailed figures, because many environmental data depend on measurement methods, geographical scope, and sectoral classification.

In terms of analytical methods, the article uses three main operations. First, trend analysis is used to identify changes in economic growth, enterprise scale, and the role of the non-state sector over a ten-year period. Second, institutional analysis is used to assess how legal and policy documents have created, or have not yet created, a market for environmental enterprises. Third, value-chain analysis is used to identify bottlenecks from waste generation, collection, separation, recycling, final treatment, to the output market for secondary materials. These operations help avoid the simplistic view that environmental enterprises will automatically develop once environmental regulations exist. In reality, the environmental market requires sufficiently strong demand, accurate prices, clear standards, and reliable data.

Table 1. Selected macroeconomic and private-sector indicators of Vietnam, 2015-2024

Year	GDP growth (%)	Non-state sector share of GDP (%)	Active enterprises (thousand, rounded)	Non-state employment share (%)
2015	6.68	42.8	442	84.7
2016	6.21	42.6	505	84.5
2017	6.81	42.7	561	84.2
2018	7.08	42.6	610	83.6
2019	7.02	42.5	668	83.1
2020	2.91	41.9	684	82.8
2021	2.58	41.5	857	82.4
2022	8.02	41.3	895	82.0
2023	5.05	40.9	921	82.0
2024	7.09	40.8	940	82.0

Note: The GDP series is based on published macroeconomic statistics; private-sector indicators are synthesized and rounded from statistical yearbooks, enterprise white books, and secondary reports. Because classification methods differ, the data should be used for trend analysis and should not replace original yearbook data.

4. Current Situation in the 2015-2024 Period

Data on growth during 2015-2024 show that Vietnam's economy had a notable recovery foundation. Before the pandemic, growth was generally maintained above 6% and exceeded 7% in 2018-2019. In 2020-2021, growth fell sharply due to the pandemic but remained positive. In 2022, growth recovered to 8.02%, before declining to 5.05% in 2023 as global demand weakened and difficulties emerged in financial and real-estate markets. In 2024, growth returned to 7.09%. This sequence implies that Vietnam has recovery capacity, but its growth model still depends heavily on industrial production, exports, FDI inflows, and energy demand; these are variables directly related to environmental pressure.

The share of the non-state sector in GDP, according to official statistical classification, generally fluctuated above 40% during 2015-2024. This figure should be read together with employment share and the number of business entities. The private sector and household businesses still absorb the majority of social labor, create livelihoods for tens of millions of people, and play a major role in trade, services, construction, processed agriculture, and supporting industries. However, GDP contribution has not increased in proportion to the number of enterprises and workers, indicating limitations in productivity, scale, governance capacity, and formalization. This is also a problem for environmental enterprises: the number of establishments participating in collection, recycling, and treatment may be large, but technological capacity and added value remain limited.

In Vietnam's enterprise ecosystem, small and medium-sized enterprises account for the overwhelming majority. This feature is both an advantage and a constraint for green growth. The advantage lies in flexibility, market proximity, and the ability to test new business models. The constraint lies in thin capital bases, difficulty in accessing long-term credit, shortages of technical human resources, weak data-management systems, and susceptibility to short-term cash-flow objectives. For environmental enterprises, especially those involved in waste treatment, wastewater treatment, or recycling, these constraints are even more serious because treatment technologies require substantial upfront investment, complex operation, and legal risks if input and output markets are unstable.

Increasing environmental pressure creates potential demand for environmental enterprises. Urbanization increases municipal solid waste, urban wastewater, and demand for environmental sanitation. Industrialization increases industrial waste, emissions, sludge, wastewater, and monitoring requirements. Export integration increases demand for emission inventories, traceability, green certification, and ESG consulting. Urban consumers themselves have also begun to pay more attention to green products, environmentally friendly packaging, and responsible brands. However, potential demand does not automatically become revenue for environmental enterprises, because many environmental services are still viewed as mandatory costs rather than values that create competitive advantages.

An important recent change is the shift from procedural environmental management to management through economic instruments. The 2020 Law on Environmental Protection, Decree No. 08/2022/ND-CP, the extended producer responsibility mechanism, requirements for waste separation at source, and the carbon market roadmap have laid the foundation for the environmental services market. This is a transition from a model in which the State directly performs or simply commissions environmental services to a model in which environmental responsibilities are allocated to actors that generate products, produce emissions, and benefit from the market. If

implemented effectively, these instruments can create long-term demand for private enterprises in recycling, material recovery, emission inventories, certification, consulting, and environmental digital technologies.

However, Vietnam's environmental market still has a dual structure. On one side are licensed enterprises that invest in technology, undergo inspection, pay taxes, sign formal contracts, and comply with environmental standards. On the other side are informal activities in collection, separation, recycling, trading of scraps, or manual treatment. The informal sector plays a certain role in material recovery and livelihood creation, but if it is not integrated into the formal system, it creates risks of secondary pollution, poor occupational safety, and unfair competition. Lessons from craft villages that recycle plastic, metal, and paper show that the informal sector cannot be eliminated by administrative orders; it requires a roadmap of formalization, standardization, and technological upgrading.

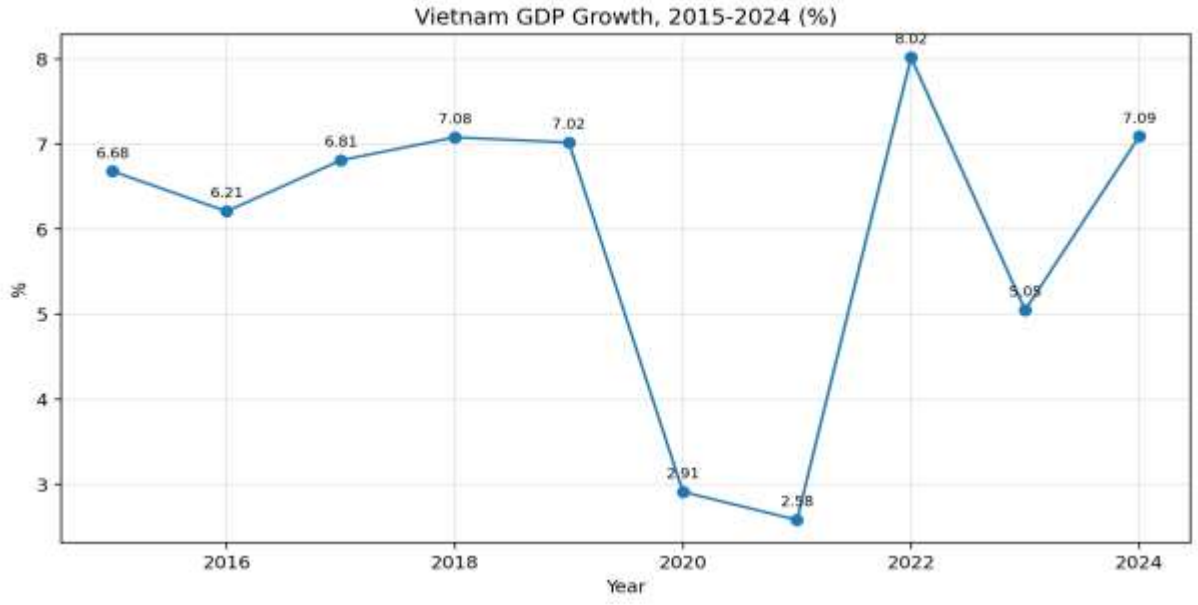
The energy market also reveals the two-sided nature of green transition. Vietnam experienced a period of rapid growth in solar and wind power, thereby creating significant space for private investment in renewable energy. Yet this rapid development also exposed limitations in planning, transmission infrastructure, pricing mechanisms, and system balancing. At the same time, in the short term, coal-fired power still accounts for a considerable share of electricity supply because of energy-security requirements and industrial growth. This creates large demand for environmental enterprises in energy efficiency, emission management, grid technologies, storage, co-processing of waste, recovery of ash and slag, and carbon services. Opportunities therefore lie not only in energy substitution but also in making the entire energy system operate more cleanly.

Another notable signal is the trade in plastic waste and recycling capacity. International information shows that Vietnam is among the major importers of plastic scrap, while domestic sorting and recycling capacity remains limited. If scrap is viewed only as cheap input material, the market can lead to the import of pollution risks. If viewed from a circular-economy perspective, scrap can become a source of secondary raw materials, but the prerequisite is a system of sorting, material standards, traceability, and standard-compliant recycling technologies. Private environmental enterprises can play a leading role in this stage, but policy must prevent competition based on outdated technologies and create stable demand for certified recycled materials.

From an industry-development perspective, environmental enterprises may be classified into six groups. The first group comprises environmental public-utility services such as waste collection, transportation and treatment, urban sanitation, and drainage. The second group involves the treatment of industrial waste, hazardous waste, and wastewater. The third group covers recycling and material recovery. The fourth group consists of clean technologies, energy efficiency, and renewable energy. The fifth group comprises consulting, testing, monitoring, greenhouse gas inventory, certification, and ESG data. The sixth group covers carbon services and green finance. The development of each group depends on different demand structures: public services depend on government contracts; recycling depends on material prices; consulting depends on market standards; and carbon depends on the legal framework and measurement capability.

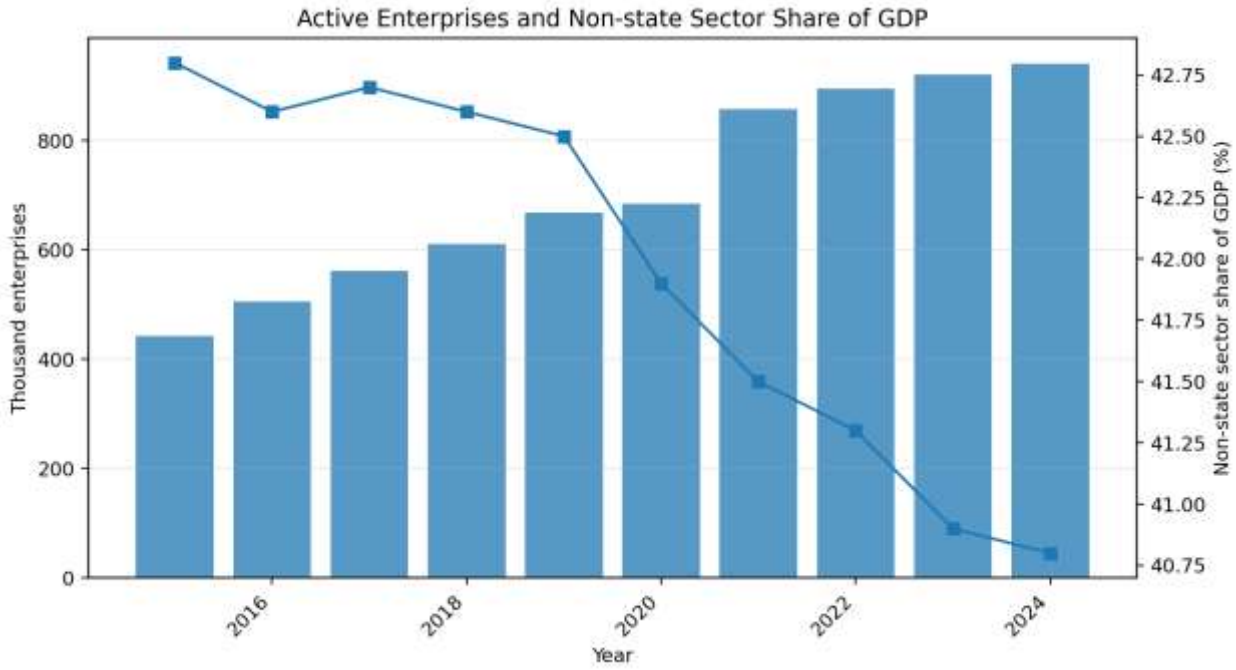
Overall, the 2015-2024 period can be considered a transition stage for environmental enterprises in Vietnam. Before 2020, the market was driven mainly by demand for waste and wastewater treatment and by certain renewable-energy projects. After 2020, the new legal framework introduced concepts such as the circular economy, EPR, greenhouse gas emission reduction, and the carbon market, expanding the scope of environmental enterprises toward data services, strategic consulting, and measurement technologies. However, this transition remains at an early stage; enterprise capabilities are uneven, market demand is not sufficiently deep, and linkages between green policy and private-sector development have not yet been designed as a national-scale environmental industry program.

Figure 1. Vietnam GDP Growth, 2015-2024



Source: Synthesized from Vietnam macroeconomic statistics, IMF, and international economic bulletins; unit: %.

Figure 2. Scale of Active Enterprises and Share of the Non-state Sector in GDP



Source: Synthesized by the author from statistical yearbooks, enterprise white books, and secondary reports; number of enterprises rounded to thousands.

Table 2. Segments of environmental enterprises in the private economic sector

Segment	Main products/services	Primary source of demand	Key bottlenecks
Environmental public-utility services	Waste collection, transportation and treatment; drainage; urban sanitation	Public contracts, service fees, urbanization	Low service prices; short-term contracts; weak source separation
Industrial treatment	Wastewater, emissions, hazardous waste, sludge	Environmental regulations, industrial parks, FDI	Large capital needs, complex technologies, input risks
Recycling and EPR	Plastic, paper, metal, electronics, packaging	Extended producer responsibility, material prices	Informal sector; lack of standards for secondary raw materials
Energy and resource efficiency	Renewable power, ESCO, energy audits, storage	Electricity costs, green orders, emission commitments	Pricing mechanisms, power purchase agreements, long-term finance
Green data and consulting	Monitoring, ESG, carbon inventory, MRV software	Export markets, carbon market, green credit	Lack of data standards, human resources, and independent verification mechanisms
Carbon services	Credit project development, brokerage, verification, trading	Carbon market, net-zero commitments, offset demand	Credit-integrity risks, limited MRV experience

5. Analysis of Environmental Enterprises within the Private Economy

The linkage between the private economy and environmental enterprises can be analyzed at three levels. At the macro level, the private sector generates most production-business activities and employment; therefore, if this sector undergoes green transformation, the spillover effect on the whole economy will be substantial. At the sectoral level, environmental enterprises provide input services that help other sectors reduce emissions, save resources, and meet market requirements. At the enterprise level, green transition creates incentives for product, process, and business-model innovation. These three levels show that developing environmental enterprises is not a task limited to the natural resources and environment sector; it is a new industrial policy for the private economy.

The first role of environmental enterprises is to reduce compliance costs for the private sector as a whole. As environmental regulations become stricter, manufacturing enterprises need solutions for wastewater treatment, emissions treatment, waste management, energy efficiency, emission reporting, and certification. Without professional service providers, each enterprise must learn on its own, leading to high compliance costs and large risks of errors. Professional environmental enterprises share technical capabilities, create economies of scale, and reduce learning costs. This is the mechanism through which a specialized service industry raises productivity for the entire economy.

The second role is to transform waste into resources. In the linear model, resources are extracted, produced, consumed, and discarded. In the circular model, materials are kept in use for as long as possible through reuse, repair, recycling, remanufacturing, and energy recovery. Environmental enterprises are the market actors that organize this cycle. However, circularity does not occur automatically if sorting costs exceed the value of recovered materials or if recycled materials lack standards and output markets. Therefore, instruments such as EPR, standards for secondary raw materials, eco-labels, and green public procurement are decisive in creating demand for recycled materials.

The third role is to develop environmental data capabilities. In the past, environmental management relied mainly on permits, periodic reports, and inspections. At present, enterprises need continuous data on energy consumption, emissions, material flows, product life cycles, and ESG impacts. The carbon market further turns data into an economic asset, because credits or emission allowances have value only when emission reductions are measured, reported, and verified. Private enterprises have advantages in developing software, sensors, data platforms, and consulting services, but national data standards are required to avoid a situation in which each party measures in a different way and results cannot be compared.

The fourth role is to create green jobs and upgrade labor skills. Environmental enterprises need environmental engineers, chemical engineers, electrical engineers, data specialists, plant-operation personnel, project-finance staff, standards specialists, and trained collection and sorting workers. If formalization is done well, the environmental industry can create more stable jobs for people currently working in the informal sector while opening new occupations in carbon inventory, ESG consulting, EPR management, and eco-design. This is an important social dimension of green growth: green transition is not only about emission reduction but also about creating higher-quality livelihoods.

However, opportunities will not automatically become outcomes without market conditions. The biggest bottleneck for environmental enterprises in Vietnam is the pricing mechanism. Environmental service fees in many localities remain low and do not fully reflect the costs of standard-compliant collection, transportation, treatment, technology investment, depreciation, monitoring, and post-treatment environmental restoration. When prices are low, enterprises are forced to cut quality or participate only in short-term profitable stages. This creates a vicious cycle: low-quality services make society unwilling to pay higher fees, while low fees prevent enterprises from upgrading technology.

The second bottleneck concerns contracts and risk allocation in environmental projects. Waste-treatment, wastewater-treatment, or waste-to-energy projects often require large capital investment, long payback periods, and dependence on input flows and payment mechanisms from governments or industrial customers. If contracts do not guarantee minimum waste volumes, lack price-adjustment mechanisms, fail to clarify responsibility for separation, or suffer from delayed payment, private enterprises will have difficulty mobilizing capital. Many environmental projects therefore become trapped between high technology requirements and contract structures that are not sufficiently attractive to long-term investors.

The third bottleneck is technical standards and enforcement. A healthy environmental market must clearly distinguish standard-compliant services from non-compliant services. If an enterprise invests in modern technology but has to compete with a cheaper operator that does not comply with standards, the market will punish the good enterprise. Weak enforcement also reduces the effectiveness of EPR, waste separation at source, and control of imported scrap. Strengthening enforcement should therefore not be understood as creating difficulties for enterprises; on the contrary, it is a condition for protecting serious environmental enterprises from unfair competition.

The fourth bottleneck is that green finance has not flowed sufficiently to small and medium-sized environmental enterprises. Many banks have developed green credit portfolios, but private environmental enterprises often lack collateral, standardized financial records, long credit histories, and the ability to prove stable cash flows. Environmental technology projects also involve technical risks that make banks cautious. Therefore, in addition to commercial credit, risk-sharing instruments are needed, such as green guarantee funds, seed capital, conditional concessional loans, green project evaluation standards, and payment mechanisms based on pollution-reduction or emission-reduction results.

The fifth bottleneck is that technological innovation is not closely linked to the market. Many environmental solutions in Vietnam remain at the level of imported equipment or isolated treatment models and have not formed a research-testing-commercialization ecosystem. Environmental enterprises need to be connected with research institutes, universities, innovation funds, eco-industrial parks, and first customers. Particularly in plastic recycling, sludge treatment, energy recovery, automatic monitoring, artificial intelligence in waste sorting, and carbon measurement, if there is no controlled experimentation mechanism, enterprises will hesitate to invest in new technologies because of licensing and market risks.

The sixth bottleneck is the lack of value-chain linkages. A recycling enterprise cannot operate effectively if input waste is mixed, contaminated, unstable, and lacks data. An industrial-park wastewater treatment company cannot optimize performance if enterprises in the park discharge wastewater that fails to meet inlet standards. A carbon-service enterprise cannot develop if its customers do not have energy-measurement systems and data-collection procedures. Environmental enterprises must therefore be placed within a value chain in which each stage has clearly assigned responsibilities. Policies focusing only on final treatment plants will not solve the problem if generation, sorting, and collection remain fragmented.

Prominent opportunities in the next decade can be identified in five markets. The first is the municipal solid waste market, where demand for source separation, smart collection, and standard-compliant treatment will increase. The second is the recycling and EPR market, especially for packaging, plastic, paper, metal, electronics, and batteries. The third is the market for wastewater and water circularity in industrial parks, urban areas, and high-

tech agriculture. The fourth is the market for energy efficiency, distributed renewable energy, storage, and demand-side management. The fifth is the market for carbon, emission inventories, and ESG consulting. These markets differ in maturity, but all require the role of private enterprises.

In the municipal solid waste market, the traditional model relies heavily on collection, transportation, and landfilling. The new strategy must shift toward waste reduction, source separation, recycling, organic waste treatment, and landfilling only the remaining fraction. Private enterprises can provide technologies for collection-route optimization, smart bins, transfer stations, organic waste treatment, compost production, and standard-compliant final treatment. However, if residents do not separate waste, if waste fees are not linked to the amount of waste generated, or if service contracts do not reward landfill reduction, enterprises will have little incentive to invest in circular models.

In the EPR market, producers and importers are responsible for recycling or making financial contributions to recycling activities. This represents a very large opportunity for environmental enterprises because it creates a more stable financial source than spontaneous scrap trading. But EPR will succeed only if there is a transparent system for verifying recycling results, certified recycling units, reasonable cost norms, and prevention of paper-based certification. Private enterprises need to invest in data governance, material-flow traceability, and results reporting; the State should focus on inspection, recognition, and handling of fraud.

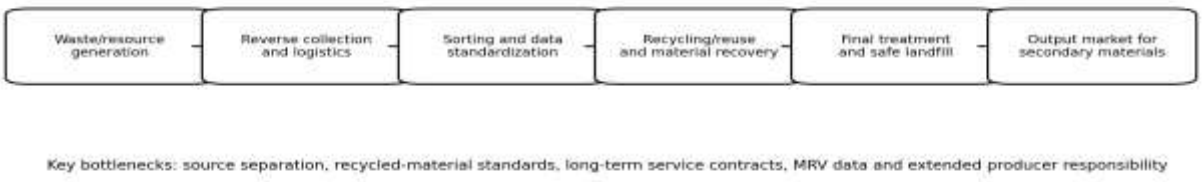
In the wastewater and water circularity market, opportunities come from industrial parks, new urban areas, hospitals, hotels, farms, and processing industries. Water is not only a production input but also an operational risk as drought, saltwater intrusion, and water-source pollution increase. Environmental enterprises can provide solutions for water reuse, decentralized wastewater treatment, online monitoring, and water-saving contracts. However, wastewater projects are often difficult to make attractive because users are not ready to pay the full cost and service-price frameworks are not flexible. The approach needs to shift from individual works to performance-based service contracts.

In the energy and energy-efficiency market, environmental enterprises can participate as energy service companies, rooftop solar investors, energy-audit consultants, providers of high-efficiency equipment, and platforms for power management. This field is directly related to production costs, so it has high commercialization potential if the financial model is clear. Exporting enterprises facing carbon requirements will have stronger incentives to reduce energy consumption. The main issues are electricity-pricing mechanisms, power purchase agreements, access to finance, and standards for measuring energy savings.

In the carbon and ESG market, new opportunities are emerging but require a high level of expertise. Enterprises need to inventory emissions under scopes 1 and 2 and gradually move toward scope 3; develop emission-reduction plans; select technologies; verify results; and connect with credit or allowance mechanisms. Private environmental enterprises can provide consulting, software, measurement, independent verification, and carbon project-development services. However, without national standards compatible with international standards, trained human resources, and mechanisms for handling conflicts of interest in verification, this market can grow quickly but with low quality.

The above analysis shows that environmental enterprises need to be placed in a higher-level strategy for private-sector development. They should not be viewed merely as enterprises serving post-pollution treatment, but as an industry that supports national productivity and competitiveness. A textile enterprise that wants to retain export orders needs to reduce wastewater and demonstrate emissions; an electronics enterprise needs to manage electronic waste and its supply chain; an industrial park that wants to attract high-quality FDI needs wastewater treatment infrastructure and clean energy. Environmental enterprises are therefore providers of soft and technical infrastructure for the entire process of growth upgrading.

Diagram 2. Value Chain of Environmental Enterprises from a Circular Economy Perspective



Source: Synthesized by the author.

Table 3. Policy instruments and their effects on the development of private environmental enterprises

Policy instrument	Main content	Effects on environmental enterprises	Conditions for effectiveness
2020 Law on Environmental Protection and Decree No. 08/2022/ND-CP	Waste separation at source, EPR, circular economy, emissions management	Creates legal demand for consulting, monitoring, recycling, treatment, and environmental data	Requires technical guidance, data, and consistent enforcement

Policy instrument	Main content	Effects on environmental enterprises	Conditions for effectiveness
Green Growth Strategy 2021-2030, vision to 2050	Reducing emission intensity, greening production and consumption	Expands the market for clean technologies, green finance, and resource-efficiency services	Requires converting goals into specific orders, contracts, and projects
EPR	Producers/importers are responsible for recycling or making financial contributions	Creates financial sources for standard-compliant recycling and reverse logistics	Requires transparent recycling results and prevention of formalistic certification
Carbon market	Emission allowances/credits, MRV, and trading	Creates a market for inventories, emission-reduction consulting, and carbon projects	Requires MRV standards, verification capacity, and credit integrity
Green public procurement	The State prioritizes goods and services meeting environmental criteria	Creates stable demand for recycled materials, clean technologies, and green services	Requires measurable criteria and avoidance of formalism and procedural costs
Green credit and green bonds	Capital for pollution-reduction, energy-saving, and green infrastructure projects	Helps environmental enterprises expand long-term investment	Requires guarantees, green project standards, and SME risk reduction

6. Specialized Issues and Expanded Analysis

A noteworthy issue is the difference between environmental enterprises serving the domestic market and those serving export supply chains. In the domestic market, demand often arises from legal regulations, public-service contracts, or urban pressures. In export supply chains, demand arises from international customers, voluntary standards, and the risk of losing orders. These two sources of demand have different dynamics but can support each other. When exporting enterprises require suppliers to treat wastewater, reduce emissions, and use recycled materials, environmental enterprises have an opportunity to provide higher-value services. When the domestic market creates sufficient scale, environmental enterprises can reduce costs and upgrade capabilities to meet international standards.

It is necessary to distinguish clearly between a "green enterprise" and an "environmental enterprise." A green enterprise is any enterprise in any sector that operates toward resource saving, emission reduction, and social responsibility. An environmental enterprise is an enterprise that provides products or services that help other actors achieve environmental objectives. A garment enterprise that uses renewable energy and treats wastewater well may be a green enterprise, but it is not necessarily an environmental enterprise. Conversely, an enterprise providing wastewater-treatment solutions for the garment sector is an environmental enterprise. This distinction matters because support policies must target the correct beneficiaries: green transition support for all enterprises, and support for the development of the environmental solution-supply industry for environmental enterprises.

In many localities, environmental services remain linked to the state budget and public-utility enterprises. This has historical reasons, because waste collection, drainage, green spaces, and urban sanitation are essential services. However, as urban areas expand and environmental standards increase, the budget cannot meet all investment needs. The private sector can participate, but it needs transparent competition mechanisms. Tendering for environmental services must be based on criteria of quality, technology, operational data, and environmental outcomes, not merely on the lowest price. If the lowest price is chosen while monitoring standards are weak, the market will encourage quality reduction and serious investors will be excluded from the competition.

Land and planning policies also strongly affect environmental enterprises. Recycling, waste-treatment, and waste-transfer facilities are often opposed by communities because of concerns about pollution and odor. If planning does not allocate suitable land, enterprises must locate facilities far from sources of waste, increasing logistics costs. If planning is not transparent, projects are easily delayed. Therefore, developing environmental enterprises must be integrated into urban planning, industrial-park planning, energy planning, and technical-infrastructure planning. Environmental infrastructure must be regarded as development infrastructure, similar to roads, electricity, water, and telecommunications.

Human resources constitute a medium-term bottleneck. Many environmental training programs in Vietnam still emphasize treatment engineering and state management, while the new market requires interdisciplinary human resources: environmental engineering combined with project finance, environmental law, data, logistics, consumer behavior, and risk communication. Environmental enterprises need people who understand technology but can also negotiate contracts, build cash-flow models, prepare ESG reports, and interact with communities. Therefore, universities should develop short courses or specialized modules on the circular economy, EPR, the carbon market, environmental project management, and digital transformation in environmental governance.

Digital transformation can create a leap for environmental enterprises. Positioning and route-optimization technologies help reduce collection costs. Sensors and automatic monitoring allow real-time tracking of wastewater and emissions quality. Data platforms connect waste generators, collectors, recyclers, and producers with EPR obligations. Artificial intelligence can support waste sorting, volume forecasting, abnormal discharge

detection, and plant-operation optimization. But digitalization has value only when input data are reliable, exchange standards exist, and results are recognized by regulators. Otherwise, digital transformation merely creates fragmented software.

One direction that should receive attention is the model of social environmental enterprises. In collection and recycling, many informal workers have practical experience, wide collection networks, and an important role in material recovery. If policy modernizes only through large enterprises, some workers may be excluded from their livelihoods. Social enterprises, cooperatives, and collection-franchise models can integrate them into formal chains: they are trained in safety, receive protective equipment, sign contracts, provide data, and are paid based on results. This approach improves environmental efficiency while ensuring social equity.

The carbon market should not be regarded as a miracle solution. It is effective only when emission caps are clear, data are accurate, measurement methods are accepted, the trading system is transparent, and sanctions are strong enough. In the early stage, environmental enterprises may rapidly develop inventory, consulting, and credit-project services, but quality risks are also high. Vietnam should avoid chasing short-term carbon credits while failing to generate real emission reductions. Policy priorities should include building MRV capacity, training experts, standardizing methodologies, and ensuring the environmental integrity of credits.

For ordinary private enterprises, the appropriate approach is to begin with resource efficiency rather than complex terminology. Enterprises can first measure electricity, water, fuel, materials, defect rates, scrap rates, and treatment costs. They can then identify saving projects with short payback periods: replacing equipment with high-efficiency alternatives, optimizing processes, recovering heat, reusing water, reducing packaging, and sorting waste. Once basic data are available, enterprises can proceed to emission inventories, green certification, and ESG strategies. Environmental enterprises should design their service products according to this roadmap, avoiding overly complex consulting packages for enterprises that are not yet ready.

Industry associations play a major role in expanding the environmental enterprise market. A single enterprise may not have enough capacity to negotiate environmental service prices or build its own data standards. But associations in textiles, footwear, fisheries, wood, plastics, and electronics can develop sectoral guidelines, lists of qualified service providers, cost-sharing models for carbon inventories, and joint training programs. When demand is organized by industry, environmental enterprises can develop more specialized solutions instead of selling generic services to all customers.

Developing environmental enterprises also needs to be linked to FDI policy. Vietnam is attracting many global manufacturing firms, but the quality of FDI in the next stage will depend on green infrastructure. High-tech investors will care about clean energy, water, waste treatment, ESG compliance, and the local supply of environmental services. If Vietnam's industrial parks have strong environmental enterprise ecosystems, this will become a competitive advantage in attracting high-quality FDI. Conversely, weak environmental infrastructure increases investor compliance costs and reputational risks for localities.

In agriculture, environmental enterprises can exploit markets for by-products, livestock waste, processing wastewater, pesticide packaging, and methane emissions. Vietnam has agricultural advantages but also faces significant environmental pressure from livestock, aquaculture, agro-processing, and chemical use. Models involving biogas, organic fertilizers, by-product reuse, recirculating water treatment in aquaculture, and agricultural emission measurement all require private-enterprise participation. This is an important but dispersed market, requiring low-cost business models that are close to farmers and provide continuous technical support.

In construction and urban development, environmental enterprises can play a role in recycled materials, construction waste treatment, energy-efficient buildings, green roofs, sustainable urban drainage, and building operation management. Rapid urbanization generates large amounts of construction waste, but reuse rates remain low. If standards for recycled aggregates, construction-waste receiving mechanisms, and public procurement using recycled materials are available, this market can expand. This is a typical example showing that environmental enterprises require output-standard policies, not only input-treatment policies.

The competitiveness of Vietnamese environmental enterprises also depends on their ability to localize technology. Not every environmental technology must be developed domestically, but enterprises need the capacity to select, operate, maintain, adapt, and integrate imported technologies into Vietnamese conditions. Many projects fail not because the technology is entirely wrong, but because it does not match waste composition, moisture content, market scale, operating capability, or financing mechanisms. Vietnamese environmental enterprises need to develop applied technical capability, not merely the capacity to purchase equipment.

Community risk governance is an often underestimated factor. Environmental projects may produce social benefits but still face opposition if residents do not trust the technology, lack information, or have previously seen treatment facilities causing pollution. Environmental enterprises should treat risk communication and data transparency as part of operations. Public disclosure of environmental parameters, facility visits, grievance reception, and prompt responses can reduce conflict. The State also needs to play the role of a credible arbiter, rather than leaving enterprises to resolve all social conflicts by themselves.

An important policy evaluation indicator is not merely the number of environmental projects licensed, but the quality of post-licensing operation. Many projects are approved but delayed, operate below capacity, or fail to achieve expected environmental outcomes. Therefore, policy should monitor actual operating rates, capacity utilization, average treatment costs, landfill-reduction levels, certified recycling rates, and the satisfaction of residents or enterprises using services. Operating data reveal whether the market is truly functioning or only exists on paper.

In the long term, Vietnam can aim to export environmental services and technologies in the region. Many ASEAN countries have similar patterns of urbanization, waste, wastewater, and small enterprises. If Vietnamese enterprises develop models for digitalized collection, medium-scale recycling, cost-effective wastewater

treatment, carbon inventories for small enterprises, and EPR consulting, these models can be replicated. However, the condition for export is that the domestic market must be sufficiently strict to create genuinely capable enterprises; an undemanding domestic market will not create internationally competitive firms.

Finally, developing environmental enterprises requires realistic thinking about trade-offs. Not every technology labeled green is appropriate; not every project that reduces landfilling is optimal; and not every recycled material is beneficial if energy costs and secondary pollution are too high. Policy must be based on life-cycle analysis, cost-effectiveness, and local suitability. A mature environmental enterprise is one that can demonstrate impacts with data, not merely through claims. This is also the new standard for the private economy in the context of green growth: growth must be supported by evidence of resource efficiency and environmental responsibility.

7. Solutions and Policy Implications

The first policy implication is the need to improve the identification and statistical framework for environmental enterprises. When environmental enterprises are not clearly recognized, support policies tend to remain generic. Vietnam needs to develop a flexible and periodically updated list of environmental industries, products, and services, including pollution treatment, recycling, resource efficiency, clean technologies, environmental data, carbon services, and green-transition consulting. This list should serve not only statistical purposes but also green credit, procurement, tax incentives, human-resource training, and policy-impact assessment.

The second implication is to design the environmental services market through accurate pricing and long-term contracts. For waste, wastewater, and industrial waste-treatment services, the mechanism should shift from short-term, low-price, cost-oriented contracting to performance-based contracts. Service prices must reflect the cost of standard-compliant treatment, encourage landfill reduction, encourage recycling, and allow enterprises to recover technology investments. For environmental infrastructure projects under PPP models, contracts need to clearly specify risk sharing regarding input volumes, input quality, policy changes, payment, and price adjustment. Otherwise, the private sector will participate only in low-risk stages while core treatment stages remain underinvested.

The third implication is to use green public procurement to create output markets. The State is a major buyer in construction, transportation, office supplies, schools, hospitals, and urban infrastructure. If public procurement criteria integrate recycled material content, energy efficiency, product life-cycle performance, and environmental standards, environmental enterprises will have more stable demand. For example, construction materials made from standard-compliant ash and slag, recycled plastic meeting technical standards, energy-efficient equipment, and compliant waste-treatment services can be prioritized in public procurement. The important point is that green criteria must be measurable, avoiding slogans that increase procedures without producing substantive change.

The fourth implication is to implement EPR transparently and support the formation of a modern recycling industry. The EPR mechanism needs to operate on a data platform that tracks material flows from products placed on the market to collection, sorting, recycling, and verification of results. Standard-compliant recycling enterprises should receive priority access to material flows and EPR financial resources. At the same time, informal collectors should be integrated through cooperatives, social enterprises, or trained subcontractors rather than being pushed out of the system. In this way, EPR can increase recycling rates while upgrading labor conditions and reducing secondary pollution.

The fifth implication is to develop green finance appropriate for small and medium-sized enterprises. Green credit policy should not focus only on large projects by large enterprises. Standardized credit packages are needed for small-scale wastewater-treatment equipment, rooftop solar, energy audits, recycling machinery, automatic monitoring, and material substitution. Banks need simple but reliable environmental and social risk-assessment criteria; enterprises need support in preparing financial and technical documentation; and the State can provide guarantees, conditional interest-rate support, or seed capital for projects with clear pollution-reduction effects.

The sixth implication is to build data and MRV infrastructure for green growth. There can be no carbon market, EPR, green credit, or ESG without reliable data. Methods need to be standardized for measuring emissions, material flows, recycling rates, energy consumption, and treatment performance. Data should be designed according to the principle of one-time input for multiple purposes: enterprises provide data for legal compliance while also using it for ESG reporting, access to credit, and customer verification. This data infrastructure is also a space for private technology enterprises to participate in developing digital platforms, sensors, and analytical services.

The seventh implication is to promote environmental enterprise clusters and eco-industrial parks. Environmental enterprises find it difficult to develop when operating in isolation. Recycling clusters, waste-treatment centers, clean-technology testing zones, and eco-industrial parks should be planned so that enterprises can share infrastructure, utilize each other's by-products, and reduce treatment costs. In eco-industrial parks, wastewater treatment, recycling, energy, logistics, and data enterprises can form a service ecosystem. This model helps shift from end-of-pipe treatment to industrial symbiosis, in which one enterprise's waste becomes another enterprise's input.

The eighth implication is to upgrade the governance capacity of private enterprises. Many small enterprises do not have dedicated environmental units, environmental cost-accounting systems, knowledge of emission calculation, or information about green support mechanisms. Business associations, universities, research institutes, and financial institutions should coordinate short-term training programs on environmental governance, ESG, EPR, carbon, energy efficiency, and green finance. Training must be linked to practical tools: inventory templates, emission-reduction plan templates, life-cycle cost spreadsheets, waste-separation procedures, and guidelines for preparing green loan applications.

The ninth implication is to create controlled experimentation mechanisms for new environmental technologies. Solutions such as waste-to-energy, gasification, chemical recycling, sludge treatment, phosphorus recovery, artificial intelligence in waste sorting, blockchain-based material traceability, and carbon credit trading platforms all need testing before expansion. If licensing procedures are too rigid, enterprises cannot experiment; if regulations are too lax, environmental risks increase. Sandbox mechanisms should clearly define scope, duration, safety standards, reporting data, liability, and conditions for scaling up after the trial.

The tenth implication is to strengthen policy coordination between private-sector development and environmental protection. Currently, enterprise policies are usually grouped under business-environment reform, credit support, taxation, and innovation, while environmental policies fall under standards, inspections, licensing, and sanctions. These policy groups need to be connected. Every private-enterprise development program should include a green-transition component; every environmental policy should assess its impact on green business opportunities. Environmental enterprises will then no longer be trapped between two policy systems, but become a priority of both.

The implementation roadmap can be divided into three stages. The 2026-2027 stage should focus on standardizing the list of environmental enterprises, improving data, piloting green public procurement, operating EPR transparently, and training enterprises. The 2028-2030 stage should focus on expanding the carbon market, forming certified recycling clusters, increasing green credit for small and medium-sized enterprises, and promoting performance-based environmental service contracts. The post-2030 stage should focus on upgrading Vietnam's environmental industry into a regional service and technology provider, participating in international value chains for carbon, recycled materials, and circular solutions. This roadmap should be accompanied by a measurement system: number of environmental enterprises, environmental service revenue, certified recycling rate, wastewater treatment rate, emission reductions achieved, and green jobs created.

From a state governance perspective, policy needs to shift from "pollution management" to "environmental market creation." Pollution management remains necessary, but punishing violations after they occur is not enough. Market creation means that the State sets standards, creates demand, ensures data, protects fair competition, shares investment risks, and allows private enterprises to provide solutions. The role of the State therefore does not decrease but changes: from doing things on behalf of the market to designing rules and supervising quality. This model is more appropriate for green growth in a market economy.

From an enterprise perspective, green transition should not be viewed as a passive cost. Private enterprises need to treat the environment as a strategic variable. Enterprises that measure emissions early, control waste, save energy, use recycled materials, and demonstrate clean supply chains will gain advantages in accessing orders, capital, and markets. Environmental enterprises need to shift from selling isolated equipment to selling integrated solutions, from preparing documents to generating data, and from end-of-pipe treatment to advising on cleaner production process design. Only then can environmental enterprises increase added value instead of being trapped in low-price competition.

From a social perspective, developing private environmental enterprises helps address a problem of trust. Residents will be more willing to separate waste and pay higher service fees if they see that the treatment system is transparent, waste is not mixed again, and the living environment improves. Manufacturing enterprises will be more willing to invest in clean technologies if regulations are enforced fairly and no one benefits from cheap pollution. Investors will provide long-term capital if contracts and data are reliable. Market trust is therefore the most important intangible asset of the environmental industry. Policies for environmental enterprise development must simultaneously build trust among the State, enterprises, and citizens.

Table 4. Policy roadmap for developing environmental enterprises associated with the private economy

Stage	Key actions	Expected outcomes
2026-2027	Identify the environmental industry; standardize data; pilot green public procurement; operate EPR transparently; train enterprises	List of environmental enterprises; data-indicator set; EPR platform; green SME training program
2028-2030	Expand the carbon market; certified recycling clusters; performance-based environmental service contracts; increase green credit for SMEs	Higher certified recycling rate; reduced landfilling; ESCO projects; professional carbon consulting enterprises
After 2030	Upgrade the environmental industry into a regional service and technology sector; export circular solutions and environmental data services	Vietnamese environmental enterprises participate in ASEAN green value chains; credit and secondary-material markets mature

8. Conclusion

This article shows that private-sector development and the promotion of environmental enterprises are two inseparable processes in the context of green growth in Vietnam. The private economy creates the drivers of growth, employment, and innovation; environmental enterprises create the capacity for treatment, recycling, resource savings, emission reduction, and compliance with green standards. When these two processes are

connected, green growth is no longer merely a policy slogan but becomes a market structure in which enterprises find economic benefits from reducing environmental impacts.

The 2015-2024 period shows that Vietnam achieved significant growth results, but environmental pressures and green-transition requirements became increasingly evident. The new policy framework on green growth, environmental protection, EPR, and the carbon market has opened an important foundation for environmental enterprises. Nevertheless, the market still faces many bottlenecks: environmental service prices do not fully reflect costs; project contracts lack stability; standards are not enforced evenly; green finance remains difficult for small and medium-sized enterprises to access; environmental data are fragmented; and the informal sector has not been integrated. These bottlenecks cause environmental enterprises to develop more slowly than the actual needs of the economy.

For environmental enterprises to become a force driving green growth, Vietnam needs to shift the policy focus from general support to the creation of specific markets. This includes identifying the environmental industry, designing attractive pricing and contract mechanisms, implementing green public procurement, ensuring transparent EPR, developing appropriate green finance, building MRV data infrastructure, creating environmental enterprise clusters, training human resources, and establishing technology experimentation mechanisms. If implemented coherently, private environmental enterprises can become a new service-industrial sector that both solves environmental problems and improves the productivity and competitiveness of Vietnam's economy in global green value chains.

The most important conclusion is that green growth cannot rely solely on administrative orders or public investment. It requires a capable, motivated, and market-supported private sector. Environmental enterprises are where policy objectives are transformed into technologies, services, data, contracts, and jobs. Therefore, the development of environmental enterprises should not be regarded as a subsidiary task of environmental protection policy; it should be placed at the center of Vietnam's private-sector development strategy in the new stage.

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