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Green Economy and Carbon Investment: Business Strategies for Facing the Global Energy Transition

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ABSTRACT

The global energy transition has reshaped business dynamics and capital markets through the rise of the green economy and carbon investment as the new foundation of corporate competitiveness. This study analyzes how companies in Indonesia formulate green business strategies while optimizing carbon investment to sustain competitive advantage during the global energy shift. A Systematic Literature Review (SLR) following PRISMA guidelines was employed to identify, screen, and synthesize 24 relevant scientific articles published between 2018 and 2025. The findings reveal that corporate sustainability strategies rely not only on low-carbon technological innovation, energy efficiency, and supply-chain transformation but also on the implementation of carbon investment, participation in carbon credit markets, and access to ESG-based financing. The integration of green economy and carbon investment enhances corporate market reputation, reduces regulatory risks, lowers capital costs, and creates new revenue opportunities through carbon asset monetization. This study concludes that the success of Indonesian companies in navigating the global energy transition is determined by their ability to position the green economy and carbon investment as the core of their long-term business strategies.

Keywords: *Carbon investment, Competitiveness, Energy transition, ESG, Green economy*

INTRODUCTION

The global energy transition has become a strategic issue that determines the direction of world economic development. The shift from dependence on fossil fuels to renewable energy is creating a major transformation in industrial structures, business models, and international investment patterns. The IEA (2024) report projects that renewable energy will dominate more than 60% of the world's energy supply by 2035, followed by a significant decline in demand for coal and oil. This trend is encouraging countries, including Indonesia, to integrate green economy principles and carbon investment as the foundation for long-term economic sustainability. In the context of the global market, green financing and carbon trading instruments have become the new standard in assessing a company's competitiveness; not only in terms of financial profitability, but also in terms of its contribution to reducing emissions, energy efficiency, and compliance with net-zero emissions targets.

The impact of the global energy transition is most evident in Indonesia's strategic business sectors, particularly the energy, mining, and carbon-intensive industries. Indonesia has declared its commitment to Net Zero Emissions by 2060, accompanied by plans for the early retirement of coal-fired power plants and increased investment in

renewable energy. However, without a competitive carbon investment strategy, national companies risk losing their competitiveness in international markets, which are now increasingly strict on Environmental, Social, and Governance (ESG) standards. Carbon investment serves as a mitigation instrument—whether through carbon offsets, carbon credits, or voluntary carbon markets—to balance corporate emissions and open up new economic opportunities from carbon credit trading. Bulkot et al. (2023) emphasize that renewable energy investment and carbon trading have become dominant global economic trends, influencing investor decisions and the direction of international funding.

In the domestic context, the integration of the green economy into business strategies is beginning to be seen in energy, manufacturing, and utility companies. Jofanka and Bayangkara (2024) show that the implementation of a green economy-based environmental management strategy at PT Pertamina Patra Niaga has led to increased operational efficiency while strengthening the company's reputation in the global market. Furthermore, the implementation of carbon taxes as a new financial instrument accelerates the transformation of emissions management. Siahaan (2025) explains that carbon taxes play a dual role: corrective for polluters and stimulatory for clean energy investment. These dynamics directly influence companies' strategies to adapt competitively in a rapidly changing business landscape. Companies no longer view sustainability as a burden (cost center), but rather as an economic opportunity and strategic differentiation.

However, changes in the structure of carbon investment present challenges on the business and financial market sides. Research by Bukran and Ramdani (2024) found that green economy policies in the manufacturing sector do encourage sustainable business innovation, but their achievements are uneven due to limited access to green financing and suboptimal fiscal incentive mechanisms. A similar situation has been confirmed in the electricity sector, where Effendi (2024) notes that the development of sustainable business planning strategies still faces problems such as fluctuations in energy demand, regulatory uncertainty, and competitive pressure from relatively cheaper fossil fuels. The direct impact is a delay in the penetration of renewable energy investment and low investor interest in long-term low-carbon innovation.

On a global scale, the energy transition has opened up huge opportunities for ESG-based green financing. Owen et al. (2018) emphasize that government policies to support green innovation financing in the early stages are crucial to private sector involvement in the low-carbon economy. Qing et al. (2024) even show that renewable energy investment and green financing contribute significantly to achieving carbon neutrality and economic sustainability in the Asian region. This means that Indonesia has strategic space to optimize environmental financing instruments as a driver of industrial transformation. If this opportunity is not utilized, Indonesian companies risk falling behind foreign companies that are more aggressive in managing carbon investment and ESG financing.

Although green economy studies in Indonesia are becoming more widespread, there are several research gaps that need to be filled. First, the study by Hutagaol, Sinurat, and Shalahuddin (2022) on strategies to strengthen state finances in the face of the threat of global recession through the green economy focuses on macro fiscal policy, but does not examine how these strategies are internalized at the level of business decisions and corporate investment orientation. Second, Konorop's (2024) research on the challenges of government policy in energy transition emphasizes the aspect of public regulation, but does not touch on the aspect of corporate response to carbon investment mechanisms. Third, Judijanto's (2025) research reviews green economy

strategies in facing global climate change but is still oriented towards general national development strategies, rather than a combination of corporate business strategies and carbon investment market dynamics. Thus, there is an urgent need to examine more specifically how corporate business strategies in Indonesia respond to the global energy transition through the integration of the green economy and carbon investment, including the implications of ESG as a parameter of competitiveness in the capital market.

Based on this gap, this study offers novelty by combining two dimensions of analysis that are rarely combined: the strategic response of Indonesian companies to the global energy transition and the transformation of carbon investment instruments as determinants of competitiveness in the capital market. In addition, this study provides theoretical contributions by mapping the relationship between the green economy, corporate business strategies, and ESG-based financing, as well as practical contributions through strategic recommendations for companies to improve their sustainable competitiveness. Therefore, the purpose of this study is to analyze in depth how companies in Indonesia formulate green economy-based business strategies through the optimization of carbon investments to face the global energy transition and its implications for the competitiveness of companies in the capital market.

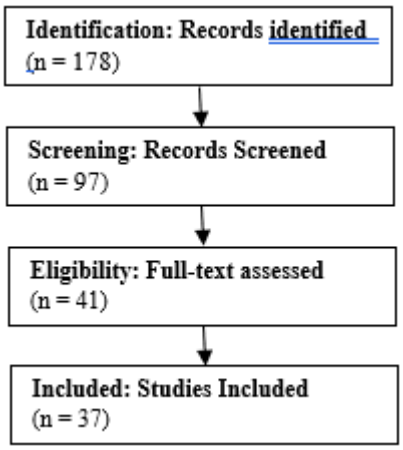
METHODS

This study uses the Systematic Literature Review (SLR) method to identify, evaluate, and synthesize the results of previous studies relevant to the themes of green economy, carbon investment, ESG, and business strategy in the context of the global energy transition. The SLR approach was chosen because it allows for comprehensive analysis based on scientific evidence (evidence-based synthesis), bringing together findings from national and international empirical studies to produce a deep strategic understanding of the research issue. The SLR procedure refers to the PRISMA guidelines, which are widely used in academic research to ensure transparency and accuracy of the process, from determining keywords, selecting sources, assessing quality, to the final synthesis of findings (Synder, 2019).

The article selection stages used the PRISMA diagram in text form: (1) Identification, in which 178 articles were found through Google Scholar, Scopus, ScienceDirect, and DOAJ using the keywords “green economy,” “carbon investment,” “ESG financing,” and “energy transition business strategy”; Next was Screening, where 97 articles were set aside due to duplication and 41 articles were eliminated because they were not relevant to the business strategy context; Next was Eligibility, where 37 articles were further selected based on the criteria of full-text access, recency (2018–2025), and context suitability. Finally, Included, where 24 articles were ultimately used in the analysis process and integration of findings in the discussion. Data analysis was conducted through a content analysis process to extract patterns, strategic findings, relationships between variables, and their implications for corporate strategies in facing the global energy transition.

The validity of the research was maintained through triangulation of concepts by comparing findings between domestic and international studies so that the conclusions obtained did not only describe one side (national or global), but also the objective response of companies to the dynamics of the global energy market. The output of this SLR method will be presented in the discussion through two dimensions: (1) the business strategies of Indonesian companies in implementing a green economy, and (2) carbon investment and green finance capacity in increasing the competitiveness of companies in ESG-based capital markets.

To ensure the quality and credibility of the reviewed studies, a quality assessment process was conducted before final inclusion. Each article was evaluated based on four criteria: (1) relevance to the research theme of green economy, carbon investment, ESG, and business strategy; (2) methodological clarity, including explicit research design and analytical approach; (3) publication quality, prioritizing peer-reviewed journals and reputable proceedings; and (4) empirical or conceptual contribution to understanding energy transition and corporate strategy. Articles that did not meet at least three of these criteria were excluded. This quality assessment process ensured that the synthesized findings were derived from robust and reliable scientific evidence, in line with SLR best practices (Snyder, 2019).



RESULTS AND DISCUSSION

Strategy Indonesian Companies' Business in Implementing Green Economy in the Era of Global Energy Transition Energy

The global energy transition has created a new competitive business environment for companies in Indonesia, where sustainability has become a determining factor of corporate competitiveness. Companies are now required not only to generate profit but also to manage environmental risks and create long term value grounded in sustainability. The adoption of a green economy has become an important differentiation strategy, particularly for carbon intensive industries such as energy, manufacturing, mining, and transportation. Jofanka and Bayangkara (2024) demonstrate that the implementation of a green economy based environmental management system in energy companies drives operational efficiency and enhances global reputation through carbon footprint reduction. This indicates that green corporate strategy has become a new form of competitive advantage rather than merely a moral obligation.

Green economy based business strategies are also developed through the transformation of production models. In the manufacturing sector, low carbon technological innovation and improved energy efficiency have become two primary priorities. Research by Bukran and Ramdani (2024) reveals that manufacturing firms integrating green innovation into their production processes can simultaneously improve efficiency and capture new market opportunities, especially growing international demand for environmentally certified products. A similar trend is found in the electricity sector, where sustainable business planning that reflects the rising demand for renewable energy has become an important factor in corporate competitiveness (Effendi, 2024). Thus, green operational excellence has emerged as a new pillar of competitiveness among domestic companies.

In addition to transforming business processes, the shift in internal investment orientation has become a crucial element. Companies are now encouraged to reallocate capital expenditure from emission intensive projects to low carbon initiatives. This aligns with Indonesia's national agenda for achieving Net Zero Emissions by 2060, which promotes reducing coal fired power plant capacity and increasing renewable energy. Konorop (2024) emphasizes that the stages of the energy transition require not only policy interventions but also corporate commitment to redefining investment directions to align with the national decarbonization roadmap. The success of this strategy depends heavily on companies' ability to anticipate global policy dynamics such as international carbon taxes, ESG standards, and carbon market incentives.

Digitalization has further strengthened the effectiveness of green economy implementation. Data driven emissions monitoring systems, smart energy management, and predictive analytics help companies reduce energy waste and enhance operational efficiency. This trend is consistent with the findings of Ionescu (2021), who states that the transition to a low carbon economy requires technology to shift corporate investment behaviors toward more environmentally friendly and efficient decisions. This illustrates that a green economy strategy is not merely a matter of value orientation, but a data informed decision making approach that can improve corporate performance.

Beyond internal aspects, companies also employ collaborative strategies to reinforce green economy implementation. Collaboration among companies, government bodies, financial institutions, and environmental organizations has been shown to accelerate business transformation. Nugroho and Angela (2024) reveal that environmental NGOs play a key role in speeding up renewable energy development in Indonesia by shaping public debate and encouraging policy change. In the corporate context, sustainability partnerships have become a business strategy to accelerate green energy innovation while increasing global investor confidence in companies.

Moreover, emission compensation through carbon trading has begun to be used as a business strategy to maintain competitiveness in international markets. Henderson and Sen (2021) note that carbon trading enables companies to balance emissions through market based offsets while sustaining business expansion during the energy transition. For companies in Indonesia, this mechanism functions not only as a mitigation tool but also as an opportunity for new economic value through the sale of carbon credits. Thus, carbon trading has become an integral component of green value creation strategies among Indonesian firms.

These dynamics demonstrate that Indonesian companies are entering a phase of increasingly mature strategic responses to the global energy transition. The green economy is no longer perceived as an abstract concept but as a core strategy for securing competitiveness in international markets that increasingly value sustainability. The next discussion will further examine the integration of carbon investment and green finance in supporting the success of these strategies.

Despite its strategic advantages, the implementation of green economy strategies is not without significant challenges. One of the main constraints faced by companies is the high cost of transition, particularly initial capital expenditures for renewable energy infrastructure, clean technology adoption, and digital emissions monitoring systems. Söderholm (2020) argues that these high upfront costs can reduce short-term profitability and discourage firms (especially small and medium enterprises) from fully committing to green transformation. Additionally, regulatory uncertainty and fluctuating carbon prices increase investment risk, making long-term planning more complex.

Another critical issue is the risk of greenwashing, where companies symbolically adopt sustainability narratives without making substantive changes to operational practices. Henderson and Sen (2021) warn that superficial ESG adoption may temporarily improve corporate image but ultimately erodes investor trust when inconsistencies between disclosure and actual performance are exposed. This creates reputational and financial risks rather than competitive advantage. Therefore, green economy strategies must be supported by measurable emission reductions, transparent reporting, and credible carbo.

Carbon Investment and Green Finance as Determinants of Corporate Competitiveness in ESG Based Capital Markets

Carbon investment has evolved into a strategic instrument that determines corporate value in the eyes of global investors. In modern capital markets, sustainability has become a financial variable of significant weight as Environmental, Social, and Governance (ESG) considerations increasingly dominate investment decision making. Qing et al. (2024) argue that renewable energy investment and green financing play an essential role in achieving carbon neutrality and enhancing economic sustainability in the Asian region, demonstrating that green financing is not merely a trend but a foundational element of the region's economic restructuring. This indicates that companies failing to aggressively adapt their carbon investment portfolios will fall behind in capital market competition.

Shifting investor preferences have also had a tangible influence on market valuation. Mundaca et al. (2016) identify that companies with clear energy transition strategies receive a market premium in the form of higher share value because they are perceived to have lower long term risks. This phenomenon is increasingly relevant for Indonesian companies competing for global financing. Investors are no longer focused solely on short term profits but also on the consistency of corporate decarbonization commitments and transitions toward clean energy. At the same time, instruments such as green bonds, sustainability linked loans, and ESG oriented investments have become the primary financing sources for green projects.

To illustrate how carbon investment enhances corporate competitiveness, the table below presents the key competitive components within ESG based capital markets:

Competitive Component in ESG Capital Market	**Strategic Implication for Companies**
High carbon disclosure transparency	Improves investor trust and long-term market premium
Clear decarbonization roadmap	Ensures access to global ESG funds and sustainability-linked financing
Active carbon credit trading participation	Creates new revenue streams and mitigates regulatory risks
Green innovation investment	Increases productivity and enhances international market acceptance
Integration of ESG in corporate governance	Strengthens corporate reputation and reduces capital costs

The table indicates that each component of ESG competitiveness produces direct strategic implications for corporate value. For example, participation in carbon credit trading is not only an emission reduction instrument but also creates a new revenue stream through the potential sale of carbon assets in international markets. Bulkot et al. (2023) emphasize that investment in renewable energy is positively correlated with corporate asset growth and access to international financing. Thus, a carbon investment portfolio is not merely a form of environmental compliance but a financial strategy for generating corporate value growth.

In addition, domestic carbon tax regulations also influence a company's attractiveness in capital markets. Siahaan (2025) notes that the implementation of a carbon tax encourages companies to reduce emissions through green energy innovation in order to maintain profitability, which ultimately increases market valuation by reducing the company's exposure to regulatory risk. Companies that adopt internal carbon pricing and green financing more rapidly will be more adaptive to regulatory pressures and fluctuations in the global energy market.

In the context of foreign investor engagement, Zahan and Chuanmin (2021) show that increased green investment strengthens energy sustainability and clean consumption in China, indicating that carbon based investment flows can serve as the foundation for low carbon economic growth. This provides strategic lessons for companies in Indonesia that expanding access to global green capital markets is essential for securing long term financing and enhancing market evaluation.

Overall, carbon investment strengthens the business position of Indonesian companies in international capital markets through improved ESG credibility, regulatory risk management, and the creation of new economic value. The following section integrates these findings to formulate strategic implications and a conceptual model for Indonesian companies in navigating the global energy transition.

Integration of Green Economy Strategies and Carbon Investment as a Model of Corporate Competitive Advantage in the Global Energy Transition

The integration of the green economy and carbon investment cannot be understood as two separate concepts but as a single strategic framework that simultaneously transforms market orientation, cost structures, and investor perceptions of companies. Within this framework, corporate strategy is no longer limited to adopting environmentally friendly practices but must internalize the logic of carbon value creation as a source of competitive advantage. Gielen et al. (2019) assert that renewable energy plays a fundamental role in the structural transformation of the global economy, showing that companies positioning themselves as early adopters of low carbon technology will secure long term market advantages. This becomes increasingly relevant as carbon instruments such as carbon offsets and carbon credits become financial assets recognized by capital markets.

The new model of corporate competitive advantage is reflected in a firm's ability to link three components: operational transformation based on the green economy, the use of carbon investment instruments, and access to ESG financing. When companies reduce emission intensity through energy efficiency and technological innovation, the cost per production unit declines, increasing profit margins. At the same time, emission reduction creates opportunities to sell carbon credits, generating additional income without expanding production. Awosusi et al. (2023) demonstrate that improvements in green resource productivity and increased penetration of renewable energy can promote carbon neutrality while enhancing economic competitiveness. Thus,

Indonesian companies are in a strategic position to achieve dual profitability through operational savings and carbon monetization.

However, this integration is not automatic. Companies must understand the structure of risks and opportunities in the energy transition market. Söderholm (2020) stresses that the main challenge lies not in technology but in the speed at which businesses adapt to changes in global market structures and disruptive innovation. Companies that adapt too slowly will face heavier transition burdens due to rising carbon prices, the reduction of fossil fuel subsidies, and increasingly strict ESG standards. In other words, resistance to transition not only results in reputational loss but also financial loss due to increased environmental compliance costs. Conversely, companies that accelerate transformation benefit from fiscal incentives, access to green financing, and flexibility for international market expansion.

In Indonesia, a competitive carbon based business strategy can be understood through four integration mechanisms. First, integrating green economy principles into production structures and supply chains to reduce energy intensity and emission related financial risks. Second, adopting carbon investment as part of asset management, positioning carbon credits as instruments of economic stabilization and corporate valuation enhancement. Third, implementing ESG governance as a financial reputation element that strengthens global investor confidence and lowers the cost of capital. Fourth, establishing multi stakeholder collaboration to expand markets and accelerate clean energy innovation. Zhang and Kong (2022) highlight that the success of corporate energy transition depends on the synergy among renewable energy policies, corporate innovation, and financial market support. This means that energy transition is not merely a technological process but a restructuring of the relationship between companies, government, and capital markets.

Beyond competitive advantage, this strategic integration also functions as a long term business risk mitigation instrument. As global pressure for decarbonization intensifies, financial risk exposure becomes higher for companies that continue to rely on fossil fuels. Henderson and Sen (2021) warn that conventional companies that fail to adopt energy transition strategies will experience asset stranding, a condition in which asset values decline before the end of their useful life. However, companies integrating green economy strategies and carbon investment experience the opposite effect, namely increased market valuation due to perceived long term growth resilience. Thus, the global energy transition is not only an environmental obligation but an economic selection system that favors companies adaptive to market change.

Furthermore, the integration of green economy principles and carbon investment strengthens national economic stability, not only corporate competitiveness. As more companies invest in renewable energy, emission reductions, and carbon trading, macroeconomic risks related to fossil fuel price volatility decline. Kiartzis et al. (2020) find that investment in green energy and the circular economy enhances national energy resilience and economic security. Therefore, the success of Indonesian companies in managing carbon based business strategies contributes to national economic resilience amid global energy shocks. This analysis explains that the global energy transition represents not only a challenge for companies but also an opportunity for structural reform of the national economy.

Based on the overall discussion, it can be concluded that green economy strategies and carbon investment are not merely supporting elements but the central foundation for building corporate competitive advantage in the era of global energy transition. Their integration generates layered strategic value that includes operational efficiency, new revenue opportunities, regulatory risk management, enhanced financial reputation,

and access to global funding. Therefore, the future of Indonesian corporate strategy will be determined by the ability to manage the energy transition as a growth opportunity rather than a market threat.

CONCLUSIONS

The findings of this study indicate that the success of companies in navigating the global energy transition is determined by their ability to integrate green economy strategies with carbon investment within a competitive business framework. Operational transformation through energy efficiency, low carbon technological innovation, and digitalization forms the core foundation of corporate strategy, while carbon investment and green financing instruments function as driving forces that strengthen financial reputation and enhance corporate attractiveness in ESG based capital markets. Thus, the green economy is not merely an environmental compliance tool but a strategy for long term growth and financial stability.

In addition, the results highlight that Indonesian companies that fail to adopt carbon transformation face significant financial risks and declining competitiveness as ESG standards, carbon pricing mechanisms, and global regulatory pressures intensify. Conversely, companies that successfully combine operational sustainability strategies with carbon investment will gain market premiums, expanded access to international financing, and long term business resilience in an increasingly sustainability driven global economic landscape. Based on these findings, the study recommends that companies in Indonesia prioritize the integration of green economy strategies and carbon investment as the core of business strategy rather than as a complementary environmental initiative. This study has several limitations. First, as a Systematic Literature Review, the findings depend on the scope and quality of available publications, which may not fully capture recent corporate practices or unpublished industry data related to carbon investment. Second, the study focuses on strategic and conceptual dimensions and does not empirically measure firm-level financial performance or emission reduction outcomes.

Future research is encouraged to conduct empirical studies using firm-level data to quantify the financial impact of carbon investment and ESG integration on corporate performance. Comparative studies across sectors or countries would also enrich understanding of how institutional contexts shape green economy strategies. In addition, future research could explore the governance mechanisms that prevent greenwashing and ensure the credibility of corporate sustainability strategies in global capital markets.

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