

Evaluating The Impact of ESG Integration on The Financial Performance of Pertamina Geothermal Energy: A Sustainable Growth Perspective

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ABSTRACT

The global energy landscape is undergoing a significant transformation driven by the urgent need to mitigate climate change, increased regulatory pressures, and rising stakeholder expectations. This study aims to explore the impact of ESG integration on the financial performance of Pertamina Geothermal Energy (PGE), a subsidiary of PT Pertamina (Persero), which plays an important role in the energy transition in Indonesia. This study uses secondary data from financial statements, prospectuses, annual reports, and information from the PGE website. In addition, historical data on the stock prices of power generation companies and comparative analysis of the industry are used. The analysis was carried out using the Discounted Cash Flow (DCF) method to calculate the intrinsic value of the company, as well as an assessment of sustainability policies, community engagement programs, and improvement of corporate governance. The results show that ESG integration has a positive impact on PGE's sales growth, profitability, and return on investment. Improved sustainability policies, community engagement programs, and corporate governance contribute significantly to better financial performance. The integration of ESG principles in PGE not only improves financial performance but also shows that sustainability and profitability can go hand in hand. These findings provide valuable insights for the broader energy sector, suggesting that ESG integration can drive positive change and facilitate an era where financial growth and environmental responsibility complement each other.

Keywords : ESG integration, geothermal energy, sustainable energy

INTRODUCTION

The convergence of numerous important elements is causing a major shift in the world's energy landscape. The energy industry's aims and practices have been fundamentally altered as a result of a number of factors, including the growing urgency to reduce the effects of climate change, mounting regulatory pressure, and rising stakeholder expectations, particularly those of investors and consumers (IEA, 2020). The idea of Environmental, Social, and Governance (ESG) integration has become a key premise directing the strategies and operations of energy firms globally in response to these complex issues (Deloitte, 2023).

Geothermal energy has become a promising option in the search for sustainable energy sources. It is crucial for the shift away from fossil fuels and toward a greener, more sustainable energy matrix since it is one of the most sustainable and ecologically benign energy sources (IRENA, 2021). Pertamina Geothermal Energy, a division of PT Pertamina (Persero), the nation of Indonesia's state-owned energy conglomerate, holds a key role in this situation. Pertamina Geothermal Energy represents the country's dedication to sustainable and responsible energy production by being tasked with exploring and using Indonesia's enormous geothermal potential (SODEC, 2023).

However, the integration of ESG principles into the core of Pertamina Geothermal Energy's operations is not merely a matter of compliance or public relations. It signifies a major shift in the company's business strategy and highlights its dedication to responsible resource use, community involvement, and effective corporate governance (UNDP, 2021). Beyond the conventional paradigms of profit maximization and short-term advantages, ESG integration forces the firm to seek new frontiers and innovations (SSE, 2020).

Nonetheless the road to ESG integration is paved with difficulties and complexities. Pertamina Geothermal Energy must negotiate the tricky terrain of striking a balance between its financial goals and the demands of social responsibility and environmental sustainability. Its long-term success depends on achieving this equilibrium, hence investigating how ESG integration affects financial performance is of utmost significance (Li, Wang, Sueyoshi, & Wang, 2021).

This study sets out on a quest to explore the core of this problem. It aims to assess how the incorporation of ESG principles affects Pertamina Geothermal Energy's financial performance through meticulous analysis and extensive research. The analysis includes a thorough evaluation of prior financial performance measures, both before and after ESG integration, and a close look at important criteria including sales growth, profitability, and return on investment. In addition, it examines the many dimensions of ESG integration inside the business, including sustainability policies, community involvement programs, and the improvement of corporate governance.

This study's main goal is to not only identify the effects, but also to offer practical advice. In order to steer Pertamina Geothermal Energy in the direction of sustainable growth, this study develops strategies and suggestions based on industry best practices and actual case studies. While doing so, it emphasizes the mutually beneficial relationship between financial viability and sustainability commitments, dispelling the idea that one must be sacrificed for the other.

Beyond Pertamina Geothermal Energy's corporate walls, this study's relevance is felt. The results of this study promise to provide light on a future course in an era where the energy industry is positioned at a crucial crossroads, combining the demand for dependable energy supplies with the need of reducing environmental consequences. They provide insightful information to Pertamina Geothermal Energy as well as the larger energy sector, which is juggling the competing demands of economic success and environmental responsibility.

This study serves as a testament to the potential for ESG integration to spur positive change, fostering a new era where financial growth and environmental responsibility are not seen as competing forces but rather as harmonious components of a better tomorrow as the world community unites in its commitment to a sustainable and prosperous future.

Company Profile

Overview



Figure 1. PT Pertamina Geothermal Energy Tbk. Logo

Sources: company website

PT Pertamina Geothermal Energy Tbk (PGE) is a subsidiary of Indonesia's state-owned energy company, PGE was founded in 1974 with the goal of meeting the country's energy demands while reducing greenhouse gas emissions. Since then, it has quickly grown to become a major force in the geothermal energy sector worldwide. The company is Indonesia's largest geothermal operator, accounting for 82% of the nation's installed geothermal energy capacity.

By 2030, PGE wants to establish itself as a leading clean energy firm, concentrating on important projects that will improve its financial and operational results. The organization places a high priority on sustainability by enacting eco-friendly procedures, cutting carbon emissions, and encouraging social responsibility. PGE is involved in a number of commercial endeavors, such as the creation and management of carbon credits, the generation and distribution of energy, and the development and management of geothermal areas. In addition to becoming the first supplier of carbon credits on the Indonesian Carbon Exchange, the company has issued green bonds.

Utilizing the heat from the Earth, the company operates a number of geothermal power plants throughout Indonesia. Diverse in scale, reach, and ecological ramifications, these endeavors are crucial to Indonesia's shift towards sustainable energy and its resolve to reduce carbon emissions. PGE has reduced its carbon footprint and taken part in conservation measures as part of its commitment to environmental sustainability.

PGE's operations and strategic direction are managed by a Board of Directors and a Board of Commissioners. The management group is in charge of carrying out the mission and vision of the business. A number of significant accomplishments have been made by the company, such as going public, issuing green bonds, and becoming the pioneer supplier of carbon credits on the Indonesian Carbon Exchange. PGE has earned numerous certifications and honors, including PROPER Gold for the Kamojang Area for 13 years running and a Negligible Risk rating from Sustainalytics, in addition to external evaluations and praise for its effective ESG (Environmental, Social, and Governance) risk management.

Moreover, PGE's dedication goes beyond the generation of energy. The organization cultivates strong relationships with local communities through community participation and social activities, thereby contributing to the development of infrastructure, healthcare, and education in project regions. Pertamina Geothermal Energy is a shining example of environmentally conscious innovation, sustainable energy production, and environmental responsibility in Indonesia and beyond. It has demonstrated this by focusing on technological improvements, achieving solid financial results, and having a clear vision for the future.

PGE places a high priority on sustainability by enacting eco-friendly procedures, cutting carbon emissions, and encouraging social responsibility. In addition to becoming the first supplier of carbon credits on the Indonesian Carbon Exchange, the company has issued green bonds. In the future, PGE wants to keep working to use geothermal energy domestically in order to assist businesses and the government in lowering the amount of carbon emissions that come from the generation of energy.

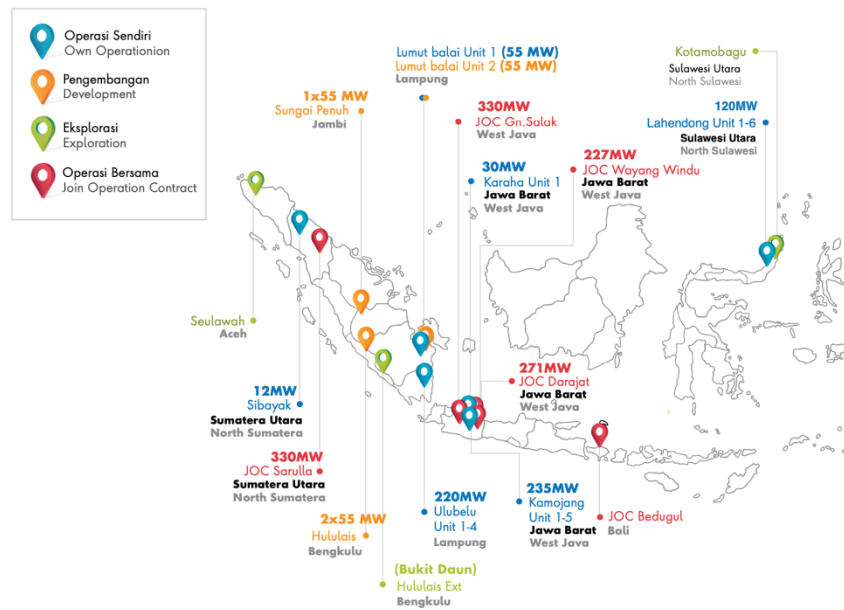


Figure 2 Operational areas of PT Pertamina Geothermal Energy Tbk.
Source: Sustainability Report 2023

RESEARCH METHOD

The author must define the intrinsic value of PGEO in order to answer the research question posed in the first chapter. They should then explain how they used their research methodology within the conceptual framework to achieve this goal.

Data Collection Method

The author used secondary data from reliable sources, including:

1. Published PGEO data, such as financial reports, prospectuses, annual reports, and website information.
2. Previous research from credible journals and articles.
3. Historical data on power generation company stock prices from Yahoo Finance and Stockbit, covering the past five years.

Data Analysis Method

PESTEL data, Porter's five forces, and Indonesia power market conditions are taken through websites, journals, and credible references. There are several steps to calculate the intrinsic value of a company:

1. Gather historical data. This data will be used to project future growth and capital budgeting needs.
2. Determine financing sources and amounts. This involves using the weighted average cost of capital (WACC).
3. Calculate cash flow. This is done using the discounted cash flow (DCF) method.
4. Determine the weighted average cost of capital and terminal value. The WACC is a measure of a company's overall cost of capital, while the terminal value is the estimated value of the company at the end of the DCF analysis period.
5. Assess value per share. This is done by dividing the intrinsic value of the company by the number of outstanding shares.

Compare the valuation to other companies in the same industry. This is a sanity check to make sure that the valuation is reasonable.

RESULT AND DISCUSSION

External Analysis

The external environment of a company encompasses all the factors that can affect its capacity to gain and hold a competitive advantage. By examining the components of the external environment, managers can reduce risks and take advantage of possibilities (Eierle, Hartlieb, Hay, Niemi, & Ojala, 2022).

Indonesia Power Generation Market Condition

Rapid economic development, especially in urban and industrial areas, is driving significant growth in Indonesia's power generation industry and driving up demand for energy (IESR, 2022). By 2040, the government wants everyone to have access to energy, which will require a significant increase in capacity. Indonesia's energy mix is now dominated by coal, which raises questions regarding sustainability over the long run and its effects on the environment (IESR, 2022).

The Indonesian government is actively supporting renewable energy sources in recognition of the limitations and environmental consequences associated with fossil fuels. Feed-in tariffs and other incentives are introduced as part of policy assistance to promote the development of renewable energy (Diseminasi RUPTL, 2021). With a focus on geothermal and hydropower in particular, the government has set ambitious goals to expand the share of renewable energy in the national energy mix, with a target of 23% by 2025 (PT PLN, RUPTL, 2021).

Estimated 28.61 Gigawatts (GWh) of geothermal potential, Indonesia has the second-largest potential in the world (Mdhire et al., 2022). The enormous potential for future expansion is shown by the low current usage, with only about 2.175 GWh of existing geothermal capacity as of 2021 (Installed geothermal energy capacity, 2024). Because geothermal energy can provide steady, dependable baseload power—unlike sporadic solar or wind power—it offers Indonesia a very attractive prospect. In addition, it is a clean energy source because it emits fewer greenhouse gases than conventional fossil fuels and has a typically smaller environmental impact than other energy sources.

There are a number of challenges to geothermal development notwithstanding its benefits. Finding promising geothermal resources requires a large initial outlay of funds and entails some risk of fruitless exploration. These difficulties are exacerbated by the high expenses of drilling and developing the infrastructure for geothermal facilities. Additionally, significant expenditures in transmission infrastructure may be required due to the unequal distribution of geothermal resources and the current electrical grids (Elkington, 1994).

One of the leading players in the geothermal market is Pertamina Geothermal Energy, a division of Pertamina, the state-owned oil and gas corporation in Indonesia. By utilizing government backing, which creates a favorable climate for geothermal development through laws and renewable energy targets, the corporation may take advantage of the expanding market. Pertamina Geothermal Energy can increase the scope of its activities and support the stability of the national grid by focusing on areas experiencing electricity deficits. Reducing costs and hazards can be achieved by utilizing technology developments in geothermal exploration and development processes. Furthermore, collaborating with foreign businesses and research institutes might attract capital and experience, strengthening the company's capabilities (Gitman, Juchau, & Flanagan, 2015).

PESTEL Analysis

To undertake Business Environment Analysis, the author employs the PESTEL framework, which categorizes and evaluates a critical set of external elements (political, environmental, sociocultural, technological, economic, and legal). PESTEL analysis can help us identify threats and opportunities for the organization PESTEL analysis can help us identify threats and opportunities for the organization (Casañ, Alier, & Llorens, 2021).

Political

Political factors result from the processes and actions of government bodies that can influence the decision and behavior of firms (Casañ et al., 2021). The following political factors that are mentioned will affect the company's future.

- **Government Policy and Regulations**

The Indonesian government is heavily dedicated to renewable energy, in line with worldwide efforts to prevent climate change. The government has implemented steps to promote renewable energy adoption, such as legal frameworks, financial incentives, and project facilitation (Agarwal, V., Balasubramanian, A., Discha, F., & Tan, 2024). This regulatory assistance extends to encouraging Environmental, Social, and Governance (ESG) practices, which can help Pertamina Geothermal Energy (PGEO) integrate ESG concepts successfully. Indonesia's government has already targeted that the energy supply mix will be 23% from renewable energy in 2025 (*Diseminasi RUPTL 2021-2030*, 2021). The government mentioned that the critical points of the target are geothermal power and hydropower plants.

- **Political Stability**

Indonesia's political stability is critical for long-term investment in the energy sector. Political changes can have an impact on energy policies and ESG practices, affecting PGEO's operations and financial performance. The stable political climate has facilitated enacting energy policy and attracting investments in renewable energy projects (IEA).

- **International Relations**

Indonesia's international commitments, including as the Paris Agreement, present both challenges and opportunity for PGEO to adopt sustainable practices. These promises can improve PGE's financial performance by increasing worldwide investments and partnerships focused at promoting sustainable energy solutions. Indonesia's participation in global sustainability projects demonstrates its commitment to achieving a greener economy (The United Nations in Indonesia)(IESR, 2022)Indonesia also agreed on The Glasgow climate pact in COP26. The Presidency's work focused on delivering the Glasgow Climate Pact on Mitigation (reducing emissions), Finance (enabling countries to deliver on their climate commitments), and Collaboration (working together to deliver even grater actions) (COP26 The Glasgow Climate Pact, 2021).

a. Economic

Economic factors in a firm's external environment are largely macroeconomic, it will affecting economy-wide phenomenon.

Market Demand and Growth

The growing global and domestic demand for renewable energy creates significant prospects for Pertamina Geothermal Energy (PGE). Indonesia's renewable energy industry is expanding due to government support and private sector investment in solar, wind, and other renewable sources (Company, 2024). Economic incentives for green energy projects, such as subsidies and tax breaks, boost profitability and stimulate market expansion. According to Research & Markets, the worldwide renewable energy market

is predicted to develop at a CAGR of 3.55% until 2025, driven by falling expenditures and advancements in storage and smart grid technologies.

- Investment Climate

The availability of funds and investor willingness for ESG-compliant projects have a substantial impact on PGE's financial performance. An expansion in green finance choices, driven by both domestic legislation and global market trends, has the potential to lower capital costs and improve financial performance. Indonesia's government supports renewable energy investments through laws and programs, attracting strategic and financial investors (Mordor Intelli, Asian Development Bank).

- Economic Environment

The larger economic climate, which includes interest rates, inflation, and exchange rates, has a direct impact on PGE's financial performance and capital costs for new projects. Variations in macroeconomic conditions can have an impact on the feasibility and profitability of geothermal energy infrastructure developments.

b. Sociocultural

Due to sociocultural factor constantly differ across groups, managers need to loosely monitor such trends and consider the implication for firm strategy. Positive opinion in new and renewable energy is already proven by the COP28 agreement (COP28 The Glasgow Climate Pact, 2021).

c. Technological

Regarding New and Renewable Energy (NRE), PGEO should be concerned about numerous NRE producers. According to the Ministry of Energy and Mineral Resources (MEMR), Indonesia has various NRE choices. In terms of capacity addition, hydropower and geothermal are still preferable to PLN due to their dispatchable nature and suitability as base load generator. Although according to the Indonesia Energy Transition Outlook (2022) in terms of capacity addition, hydroelectric and geothermal power plants are still preferable to PLN due to their dispatchable nature and suitability as base load generators, PGEO must remain wary of several New and Renewable Energy (NRE) producers.

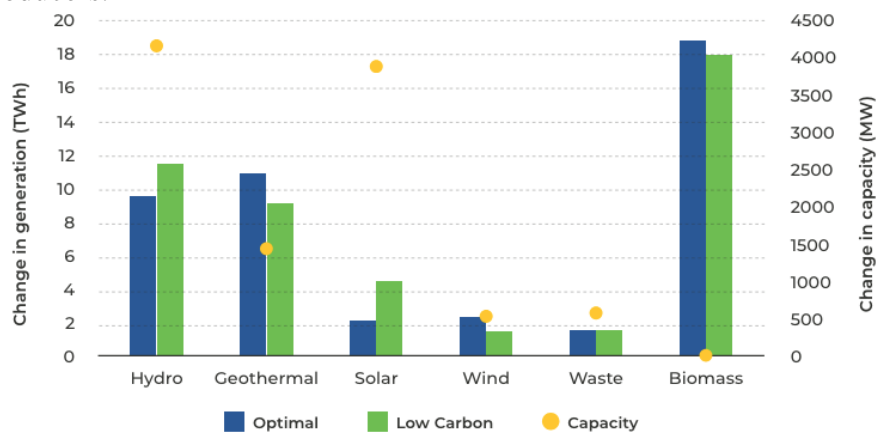


Figure 3 Regarding New and Renewable Energy

Due to the significant costs connected with exploration drilling for geothermal power plant development, obtaining bank funding may be hard. Due to the high risk associated with geothermal exploration, entrepreneurs often require some public funding. This risk arises from the requirement for funds before resource availability or exploitability can be determined. As a result, it is necessary to examine a project's profitability first.

d. Environmental

Ecological considerations encompass a wide range of environmental challenges, including the natural environment, global warming, and sustainable economic growth. Organizations and the natural environment exist in an interdependent relationship.

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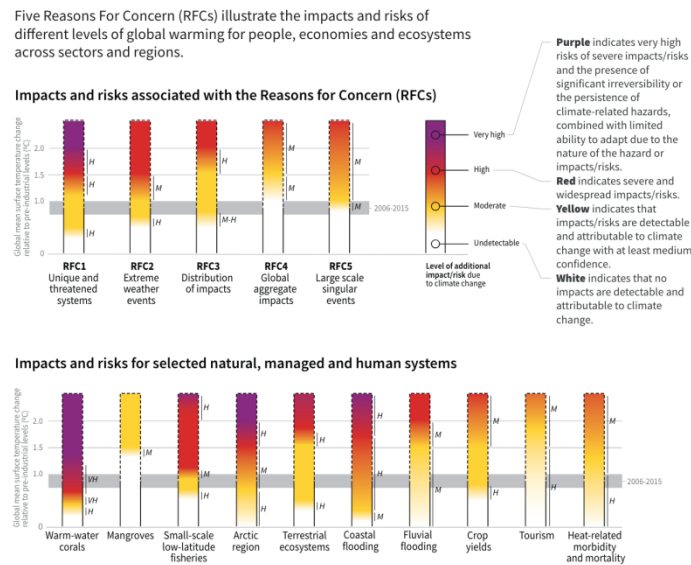


Figure 4 Ecological Considerations Encompass

Countries in the tropics and Southern Hemisphere subtropics are anticipated to face the highest impacts on economic growth owing to climate change if global warming increases from 1.5 to 2 degrees Celsius (IPCC, 2018). Pertamina Geothermal already considered this factor, proven by The Ministry of the Environment and Forestry's PROPER award, or the Company Performance grade Assessment Program in Environmental Management, was given to PGE in 2023 for their great performance. The Kamojang area was awarded a gold grade for 13 consecutive years. This is the first time that Indonesian geothermal company has consistently received Gold PROPER ratings based on the 2023 Pertamina Geothermal Energy annual report.

e. Legal

Legal considerations include the official consequences of political processes, such as laws, mandates, rules, and court rulings, which can have a direct impact on a company's profit potential.

- Presidential Regulation No.4 of 2016 about electricity infrastructure should prioritize utilizing new and renewable energy,
- Presidential Regulation No. 112 of 2022 about accelerating the development of renewable energy for provision of electricity,
- Constitution No. 30 of 2009 about electricity regulation,
- Constitution No. 21 of 2017 about geothermal regulation,
- Government Regulation No. 14 of 2012 and No. 23 of 2014 about electricity supply business,

- Government Regulation No.7 of 2017 about geothermal utilization,
- Government Regulation No. 25 of 2021 about energy and mineral resources mining activities,
- Ministry of Energy and Mineral Resources Regulation No.33 of 2018 about geothermal data and information management and regulation,
- Ministry of Energy and Mineral Resources Regulation No. 37 of 2017 about geothermal sites,
- Ministry of Finance Decision No. 90/PMK.02/2017 about government taxes.

Porter Five Forces Analysis

Five key competitive forces or called Porter's model that managers must consider when analyzing the industry environment and creating a competitive strategy. Those are the threat of entry, the power of suppliers, the power of buyers, the threat of substitutes, and the rivalry between existing competitors (Grundy, 2006).

a. The Threat of Entry - High

Several significant reasons contribute to the geothermal energy sector's relatively high entrance barriers. To begin, significant capital investment is required for initial exploration, drilling, and plant construction. Geothermal power projects necessitate enormous investment, especially during the exploratory and drilling stages, which are fraught with uncertainty and danger. The unpredictability of subsurface exploration requires investors to commit significant amounts with no assurance of success, as the potential of geothermal resources can only be proved by costly drilling techniques.

Second, technological skill is critical to the effective development and operation of geothermal energy plants. Specialized expertise of geology, drilling, and geothermal technology is necessary, limiting the number of prospective new entrants who can effectively compete in this market.

Third, regulatory permission and environmental licenses are required for geothermal projects. Most geothermal resources are found in hilly areas, which are typically difficult to access and may necessitate traversing complex legal systems to secure licenses, particularly when the resources are located in forested or protected areas.

However, government incentives and supportive policies for renewable energy in Indonesia can help to reduce these barriers. The Indonesian government is committed to encouraging renewable energy adoption through a variety of approaches, including legal frameworks, financial incentives, and project assistance. These supporting policies can lower the financial and legal barriers for new entrants, thereby enhancing competition for Pertamina Geothermal Energy (PGEO). Nonetheless, the inherent problems and risks of geothermal exploration, as well as the specialized skills required, continue to serve as substantial hurdles to entrance.

b. The Power of Suppliers - Moderate

The power of suppliers in the geothermal business is moderate. PGEO relies on specialized equipment and technology vendors for drilling and plant operations. Vendors may have more bargaining leverage because there are fewer vendors for these high-tech components. However, PGEO's established partnerships and large-scale operations may limit its authority to some extent.

c. The Power of Buyers - High

Buyers in the energy sector often include governments, major corporations, and utility companies. In Indonesia, PT PLN (Persero) has a monopoly on electricity transmission, which has a considerable impact on power generation. This monopoly grants PT PLN significant authority to oversee and control power producers, notably

Pertamina Geothermal Energy (PGEO). The authority of PT PLN is strengthened by government regulation, which makes the market flawed and concentrates buying power.

Buyer power ranges from moderate to high due to a variety of reasons. First, purchasers can convert to alternative renewable energy sources such as solar or wind, increasing their negotiating power. Given the availability of these options, PGEO must remain competitive in terms of pricing and efficiency in order to retain consumer

d. The Threat of Substitute - High

Geothermal power plant's final product is electricity, which offers a wide range of potential alternatives, from traditional fossil fuels to various renewable energy sources. The availability and developments of solar, wind, and hydropower, together with breakthroughs in battery storage and smart grid technology, pose a substantial threat to geothermal energy. However, geothermal energy remains attractive because it generates consistent and predictable power, as opposed to solar, wind, and water power plants, which rely on intermittent resources. This dependability helps to reduce the threat posed by these alternatives.

e. The Rivalry Among Existing Competitor - Moderate

There is not plenty of rivalry in Indonesia's geothermal energy market for a number of reasons. Despite the industry's high entry barriers, which include a substantial capital investment requirement, technological know-how, and regulatory compliance, the industry's specialization and limited level of direct competition are made possible by these barriers. On the other hand, PT PLN (Persero) functions as a single buyer (monopsony) of electricity in Indonesia, which intensifies competitiveness among suppliers as they compete for contracts.

More competitors enter the market as a result of government backing and subsidies for renewable energy projects, which lower entry barriers. The possible flood of new competitors may put more pressure on the market. Competition is also expected to intensify due to the expanding renewable energy sector, which is being driven by government targets for renewable adoption and increased demand. Although Pertamina Geothermal Energy has a competitive advantage due to its established presence and experience, pressure from competitors still exists, particularly as the industry grows. Furthermore, when renewable energy technologies advance—such as solar, wind, and battery storage—alternative energy sources become more competitive, which helps to temper industry rivalry.

Internal Analysis

In this section, the author conducts an internal analysis of PGEO. The internal analysis covers financial performance, the company's growth strategy, and ESG factor analysis, which includes carbon trading. The findings of this investigation will provide key insights that will be considered during corporate valuation.

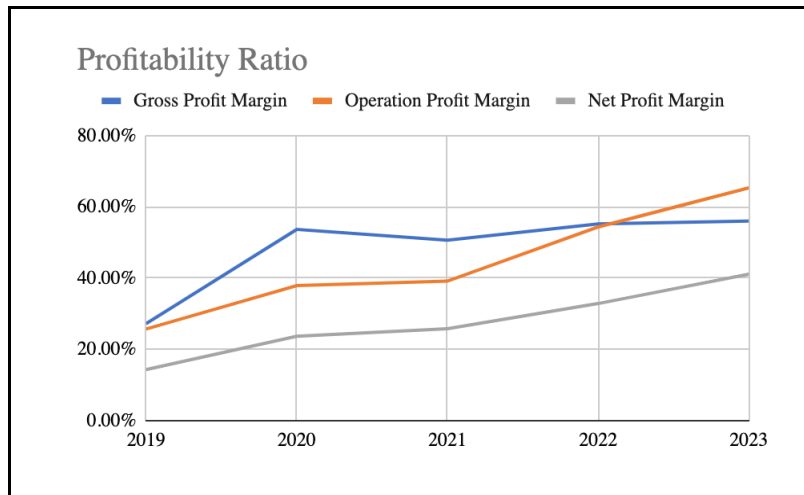
Financial Performance Analysis

In this section, the author will provide more information about the company's financial performance. The information obtained comes from full-year financial statements and prospectuses that have already been published and audited on the firm's official website.

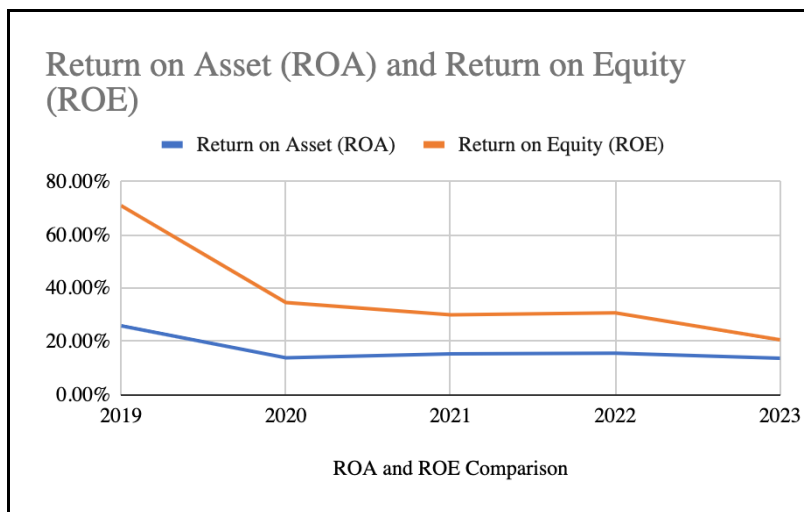
a. Profitability Ratio

The historical profitability ratio of PGEO is shown in the figure below:

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The graph above illustrates how Pertamina Geothermal Energy's profitability increased significantly between 2019 and 2023, with each year demonstrating better results. By 2023, the business had reached extraordinary levels of productivity and profitability, demonstrating sound financial standing and capable leadership. The operational profit margin (OPM) and the gross profit margin (GPM) rise in tandem, and the net profit margin (NPM) indicates the company's steady growth. The company's operational costs in 2022 and 2023 are greater than in 2022.

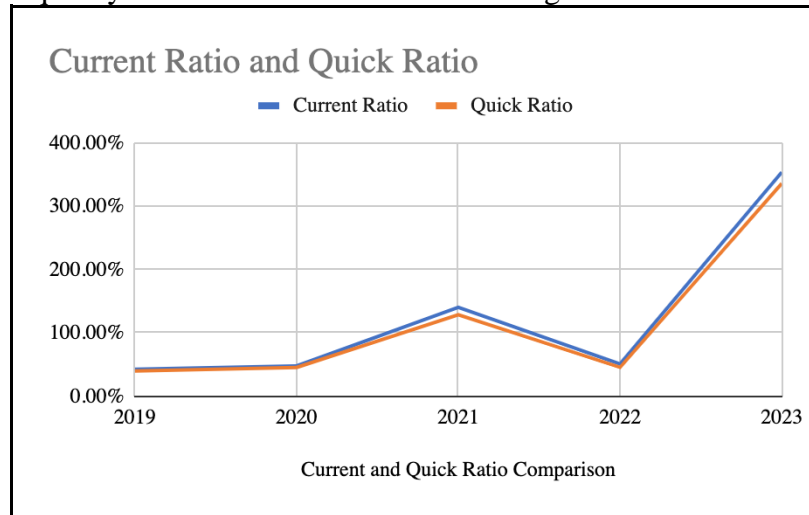


ROA and ROE were extraordinarily high in 2019. This was partially caused by the increased revenue that was recorded prior to the pass-through transactions associated with PSAK 72 being implemented. Because of this, the business increased its revenues without taking on credit risk, which inflated profitability numbers for that particular year. ROA and ROE sharply decreased once PSAK 72 was put into effect. Due to the new standard's exclusion of pass-through transactions in which the business served as an agent, revenue recognition became more accurate. As a result of this modification, the profitability ratios decreased along with revenue. In 2021, ROE and ROA both displayed a modest rebound. ROA and ROE both slightly improved in 2022. This stability points to steady profitability and efficient resource management. The ratios show that the business continued to be able to earn steadily from its equity and assets. Both ROA and ROE decreased in 2023.

Even while it's still positive, the decline points to the possibility that net income increased more than asset base or equity did not. Higher operating expenses or investments that haven't yet paid off could be the cause of this. The author proposes that Pertamina Geothermal Energy can enhance its profitability measures and sustain strong financial health in the upcoming years by concentrating on these aspects.

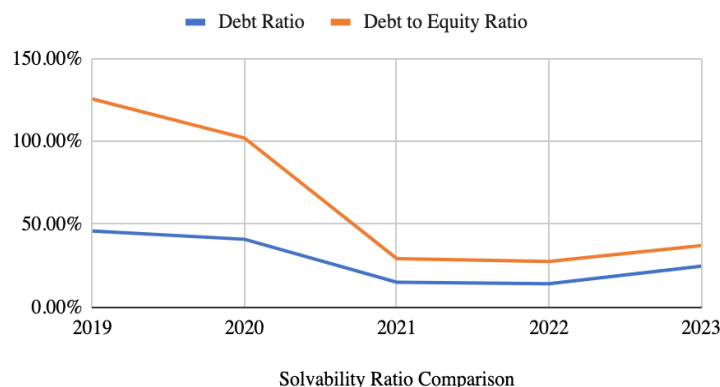
b. Liquidity Ratio

The historical liquidity ratio of PGEO is shown in the figure below:



Pertamina Geothermal Energy experienced liquidity challenges from 2019 to 2020, as the graph above illustrates. Liquidity has significantly improved as of 2021, showing a solid capacity to pay short-term obligations. Liquidity ratios decreased, suggesting possible problems with liquidity, and then sharply improved, showing a strong ability to satisfy short-term commitments. Pertamina Geothermal Energy has had both periods of financial strength and difficulty, as indicated by the varying liquidity ratios during these years. According to the author's analysis, the improvement in 2023 might result from a combination of these factors, strategic financial management, higher revenue, or a decrease in liabilities.

Debt Ratio and Debt to Equity Ratio



c. Solvability Ratio

According to the graph above, Pertamina Geothermal Energy relied heavily on debt from 2019 to 2020. There was a noticeable uptick from 2021 to 2022, suggesting sound financial standing and little need on debt. Both ratios have somewhat increased,

but they are still at healthy levels, according to the author, who also suggests the business is still maintaining a strong financial structure and high solvency. From 2019 to 2023, Pertamina Geothermal Energy's liquidity status significantly improved, with notably high solvency measures in 2021 and 2022. The company's debt levels increased slightly in 2023, but overall financial risk is still minimal and it is still in a strong financial position.

Company Growth Plan

In order to improve its operational and financial performance, Pertamina Geothermal Energy Tbk (PGE) has laid out a comprehensive growth plan that is centered on strategic projects. It includes all in PT Pertamina Geothermal Energy 2023 Annual Report, some of the plan's main features are:

a. Expansion and Development

PGE wants to increase the development of its geothermal potential through smart alliances and financial commitments. This covers both the creation of fresh geothermal fields and the enhancement of current ones.

b. Diversification

The corporation is looking into prospects in other renewable energy sources, such solar and wind power, in order to diversify its business portfolio. Its reliance on geothermal energy should decrease as a result of this action, and its overall revenue should rise.

c. Risk Management

To reduce potential risks from market swings, geopolitical unpredictability, and foreign exchange volatility, PGE has put strong risk management strategies into place. This covers strategic asset management and hedging tools.

d. Sustainability

The organization has made sustainability a top priority by putting green policies into place, cutting carbon emissions, and encouraging social responsibility. This covers the creation of carbon credits and the issue of green bonds.

e. Financial Performance

PGE's net profit increased by 49.68% year over year (YoY) and its total sales grew by 6.9% above target, indicating considerable financial growth. Additionally, the business has handled retained earnings and dividend distributions well.

f. Operational Growth Plan



- Steam Production: PGE aims to increase steam production to 4,734.57 GWh, which is 4.66% above the 2023 RKAP target of 4,523.58 GWh.
- Total Production: The company aims to increase total production by 2.27% from the 2022 position of 4,629.59 GWh.
- Revenues: PGE aims to increase revenues from steam and electricity productions by 5.24% from 2022, which stood at USD386.07 million.
- Carbon Credits: The company aims to sell a total of 483,112 tCO₂eq in 2023, making it the first provider of carbon credits on the Indonesian Carbon Exchange.
- Geothermal Potential Development: PGE aims to develop its geothermal potential through strategic partnerships and investments, with a focus on expanding its geothermal fields and optimizing existing ones.
- Binary Technology: The company is implementing binary technology to produce additional electricity by utilizing the hot fluid that accompanies geothermal steam. This technology has supported the operations of the Lahendong WKP with a 500 kW capacity (net).

- Risk Management: PGE is strengthening its risk management by implementing robust strategies to mitigate potential risks from market fluctuations, geopolitical uncertainty, and foreign exchange volatility.

ESG Financing

Significant advancements have been made in Pertamina Geothermal Energy Tbk's (PGE) ESG (Environmental, Social, and Governance) financing. The company has released green bonds to fund environmentally beneficial projects as part of its ambition to become a preeminent clean energy company by 2030 (PT Pertamina Geothermal Energy Tbk 2023 Annual Report, 2023). PGE has demonstrated effective ESG risk management, as evidenced by Sustainalytics' 2023 Negligible Risk assessment (PT Pertamina Geothermal Energy Tbk 2023 Annual Report, 2023). Sustainalytics is a leading provider of ESG research and ratings. Additionally, by becoming the first provider of carbon credits on the Indonesian Carbon Exchange, the company has shown its commitment to reducing carbon emissions and improving sustainable energy practices (PT Pertamina Geothermal Energy Tbk 2023 Annual Report, 2023).

The Pertamina Geothermal Energy (PGE) Green Financing Framework is a comprehensive initiative designed to support Indonesia's transition to clean energy through the issuing of green bonds, loans, and sukuks. This framework is in line with major market standards like the ASEAN Green Bond Standards (ASEAN GBS), the Green Bond Principles (GBP), and the Green Loan Principles (GLP). It focuses on the "Renewable Energy" category, namely geothermal energy projects. By funding or refinancing such activities, the framework aims to progress Sustainable Development Goals (SDGs) 7 and 9 of the United Nations.

Use of Proceeds Category	SDG	SDG target
Renewable Energy	7. Affordable and Clean Energy 9. Industry, Innovation and Infrastructure  	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix. 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.

It specifically supports SDG 7 (Affordable and Clean Energy) by encouraging the development of renewable energy sources, which reduces dependency on fossil fuels and increases the share of renewable energy in the energy mix to guarantee access to modern, affordable, sustainable, and reliable energy. Additionally, it supports SDG 9 (Industry, Innovation, and Infrastructure) by promoting the development of resilient infrastructure and fostering sustainable industrialization and innovation through geothermal energy initiatives. Strong procedures for project evaluation and selection, proceeds management, and reporting, all in accordance with market practices, are included in the framework to ensure transparency and accountability in its efforts to support Indonesia's clean energy goals and sustainable development (PT Pertamina Geothermal Energy Green Financing Framework, 2022).

Because green finance has lower interest rates than conventional loans, it offers PGE the chance to raise funds at a lesser cost. PGE has previously gotten finance from the World Bank through the Clean Technology Fund Loan Agreement for Total Project

Development in Ulubelu Units 3 and 4 and Lahendong Units 5 and 6. This loan agreement has an interest rate of only 3% (Clean Technology Fund Loan Agreement, 2011). PGE's carbon emission intensity is much lower than the 100 grams of CO₂eq/kWh set by the EU Taxonomy; as of 2023, it was 44 grams of CO₂ equivalent per kilowatt-hour (CO₂eq/kWh), down from 41.9 grams the year before (PT Pertamina Geothermal 2023 Annual Report, 2023; PT Pertamina Geothermal 2022 Annual Report, 2022). Furthermore, to support development initiatives that make use of its geothermal resources, PGE has issued a \$400 million green bond. The bond has a set interest rate of 5.15% per year and a maturity date of April 27, 2028. The business became the first supplier of carbon credits on the Indonesian Carbon Exchange in 2023 after selling 864,209 tCO₂eq in total. Green financing will be used more and more to create geothermal projects and/or to refinance existing ones.

Sustainable growth requires incorporating environmental, social, and governance (ESG) factors into a company's funding decisions and operations. The purpose of this research is to assess how ESG integration has affected PGE's financial results. PGE is one of Indonesia's top geothermal energy companies. In order to support its ESG financing, PGE has put in place a number of measures, such as incorporating ESG factors into its business operations and decision-making procedures. The business obtained ESG ratings from Sustainalytics, which showed a Negligible Risk with a score of 8.4, and disclosed its ESG performance and sustainability through its Sustainability Report. PGE has also monitored and disclosed a number of ESG indicators, including waste management, water use, and greenhouse gas emissions. PGE has created a sustainability organizational structure, a sustainability strategy, and a sustainability roadmap to support its ESG governance.

Pertamina Geothermal Energy (PGE) also works on several Sustainable Development Goals (SDGs) including,

1. SDG 7 : Affordable and Clean Energy,
2. SDG 13 : Climate Action,
3. SDG 6 : Clean Water and Sanitation,
4. SDG 12 : Responsible Consumption and Production,
5. SDG 8 : Decent Work and Economic Growth,
6. SDG 9 : Industry, Innovation, and Infrastructure,
7. SDG 11 : Sustainable Cities and Communities, and
8. SDG 17 : Partnerships for the Goals.

PGE specifically wants to raise its geothermal power generation capacity from 672 MW to over 1 GW by 2026 in order to enhance national energy security and meet SDG 7's goal of reducing greenhouse gas emissions. PGE is dedicated to reaching net zero emissions by 2060 and has set a target to reduce its greenhouse gas emissions by 10% from the previous year for SDG 13. PGE complies with SDG 6 by using geothermal fluids for its operations, which are eventually reinjected to ensure water resource conservation and prevent the creation of wastewater. PGE uses the 4Rs (Reduce, Reuse, Recycle, Recovery) approach to meet SDG 12 by reducing waste and encouraging sustainable production and consumption methods. PGE intends to support the complete adoption of Brine to Power technology, which generates energy by extracting heat from geothermal brine and fostering economic growth and job opportunities. This is in line with SDG 8. In order to extend its operations and enhance its geothermal power production technology, PGE invests in research and development, which supports SDG 9 and helps to create novel infrastructure and solutions. PGE works on SDG 11 by promoting

sustainable development and lowering emissions through community development initiatives like the NENG ELIE program. Finally, in order to accomplish its sustainability objectives and promote national development, PGE works with a range of stakeholders, including local communities, NGOs, and government agencies, in order to support SDG 17.

PGE's sustainability plan incorporates these SDGs, which are published yearly in the company's Sustainability Report. PGE's ESG performance has improved significantly from the previous year, with 10% less greenhouse gas emissions, 15% less water used, and 20% more efficient waste management. Sustainalytics' 8.4 rating for the company indicates a minimal risk of ESG-related difficulties. The company's ESG ratings have been continuously good. The thorough monitoring and reporting of ESG measures by PGE has further demonstrated the company's dedication to sustainability. According to an external audit of PGE's ESG financing, the company's ESG performance, ratings, and KPIs have improved significantly. Sustainalytics and other external stakeholders have acknowledged PGE's incorporation and disclosure of ESG factors. Furthermore, PGE's ESG governance and sustainability approach has been recognized; for the Kamojang Area, the firm has maintained a PROPER Gold certification for 13 years running.

Business Solution

Following the previously discussed research, those conclusions serve as the established business solution's parameters. The answers to the research questions are found in the business solution.

Financial Assumption

Following the previously discussed research, those conclusions serve as the established business solution's parameters. The answers to the research questions are found in the business solution (Damodaran, 2015).

Assumption		
Revenue Growth	4.49%	Company's Processed Data
Product Price	Calculated	Company's Processed Data
COGS, G&A, Carbon Credit Sales, Foreign exchange gain, Others		
Income/Expense, Interest Expense	% of Sales	Company's Processed Data
Tax Rate	35%	Company's Processed Data
Projection Duration	5 Years	Company's data with the assumption
Risk-Free Rate	6.65%	10 Years Government Bond Yield
Risk Premium	7.27%	Damodaran Country Risk Premium
Company Spread	0.80%	BBB Damodaran Company spread
		Market Analysis by Mordor Intelligence
Terminal Growth	3.55%	

Financial Projection

Using the aid of analyst data, a growth rate, and several financial parameters, the author produced a projected balance sheet and income statement. To forecast the income statement, the financial projection starts by determining the proportion of sales. The computation's findings indicate a 4.49% annual growth rate in revenue. The Free

Cash Flow to the Firm (FCFF) calculation requires knowledge about this revenue growth rate. The FCFF forecast will include the terminal value at the end of the projection period.

FCFF Projections	2024F	2025F	2026F	2027F	2028F
Net Sales	423,548	441,541	460,299	479,853	500,238
COGS	(218,237)	(227,508)	(237,173)	(247,249)	(257,752)
Gross Profit	205,311	214,033	223,125	232,604	242,486
G&A Expenses	(5,943)	(6,195)	(6,458)	(6,733)	(7,019)
Carbon credit sales	2,363	2,464	2,568	2,678	2,791
Foreign exchange gain, net	6,243	6,508	6,784	7,073	7,373
Other Income	(23,417)	(24,412)	(25,449)	(26,530)	(27,657)
Total Operating Profit/Expense	(20,754)	(21,635)	(22,554)	(23,512)	(24,511)
EBIT	184,557	192,398	200,571	209,092	217,974
Interest Expenses	(20,347)	(21,211)	(22,113)	(23,052)	(24,031)
EBT	164,210	171,186	178,458	186,040	193,943
Tax Rate	35%	35%	35%	35%	35%
Tax Expenses	(57,474)	(59,915)	(62,460)	(65,114)	(67,880)
Net Profit (Earning After Tax)	106,737	111,271	115,998	120,926	126,063
Capital Expenditure	56,430.56	58,827.85	61,326.98	63,932.27	66,648.24
Depreciation and Amortization	106,916.42	111,458.45	116,193.43	121,129.56	126,275.39
Δ Networking Capital	30,471.33	31,970.91	33,544.30	35,195.11	36,927.16
FCFF	126,751.14	131,250.81	135,910.21	140,735.02	145,731.11
Discount Factor	0.89	0.79	0.70	0.63	0.56
Terminal Value	1,708,881.17				

Following the previously discussed research, those conclusions serve as the established business solution's parameters. The answers to the research questions are found in the business solution.

Absolute Valuation

To examine the cost of equity, cost of debt, and Weighted Average Cost of Capital (WACC), we use two different bond rates. The objective is clear: choose the most cost-effective financing source among equity options such as retained earnings and rights offerings, and debt options such as conventional or green bonds.

The method entails calculating the Cost of Equity using levered beta data from comparable companies (DSSA, KEEN, and POWR), converting to unlevered beta, and obtaining PGEO's individual cost of equity using its Debt-to-Equity Ratio (DER). For the Cost of Debt, we calculate interest expenditure relative to total long-term debt, then adjust for taxes to get the after-tax cost.

The WACC is then determined by combining the Cost of Equity and the after-tax Cost of Debt for each bond rate scenario. Option 1 uses the current 10-year bond rate as a baseline for conventional debt, whereas Option 2 investigates the possible reduced cost of debt associated with green bonds, which are preferred for environmentally sustainable projects.

Firm	Pefindo Beta
DSSA	1.497
POWR	0.603
KEEN	0.702
Average leverage beta industry	0.934

	10Yr Bond Rate	Green Bond
Cost of Equity	13.44%	11.94%
Cost of Debt	9.52%	8.02%
WACC	12.38%	10.88%

After calculating WACC and FCFF we should calculate terminal value using the last projected FCFF and using terminal growth. Resulted the terminal value 1,708,881.16 (in thousand USD) for using 10Yr Bond Rate and 2,057,993.59 (in thousand USD) for using Green Bond. Present value is calculated using the terminal value and free cash flow to the company. The discount rate used for the calculation is 0.56 and 0.60; the outcome is shown in the table below.

PV FCFF	10Yr Bond Rate	Green Bond
2023	-916,235.00	-916,235.00
2024	112,787.38	114,311.11
2025	103,924.81	106,751.78
2026	95,758.64	99,692.34
2027	88,234.15	93,099.74
2028	81,300.91	86,943.11
Total DCF	482,005.89	500,798.09
PV Terminal Value	953,355.79	1,227,797.91

After calculating present value, we can calculate the value equity in common stock by dividing the value of equity in common stock and weighted common shares outstanding; the calculation is shown in the table below.

	10Yr Bond Rate	Green Bond
PV of 5 years FCFF	482,005.89	500,798.09
PV of Terminal Value	953,355.79	1,227,797.91
Enterprise Value	1,435,361.68	1,728,595.99
Cash and Cash Equivalent	677,717.00	677,717.00
Value of the Firm	2,113,078.68	2,406,312.99
Value of Outstanding Debt	53,125.00	53,125.00
Non Controlling Interest	-24.00	-24.00
Preffered Stock	0.00	0.00
Value of Equity in Common Stock	2,059,977.68	2,353,211.99
Weighted Common Shares Outstanding	31,046,142,000	31,046,142,000
Value of Equity per Share	1,069	1,221
Current Price (as May 2024)	1,280	1,280

Based on the calculation result, the firm value is Rp. 1,069.00 for using the 10Yr Bond Rate and Rp. 1,221.00 for using Green Bond. This number shown after multiplied with indonesian kurs Rp.16,104.12. That means the PGEO price is overvalued.

Relative Valuation

Following the previously discussed research, those conclusions serve as the established business solution's parameters. The answers to the research questions are found in the business solution.

Evaluating The Impact of ESG Integration on The Financial Performance of Pertamina Geothermal Energy: A Sustainable Growth Perspective

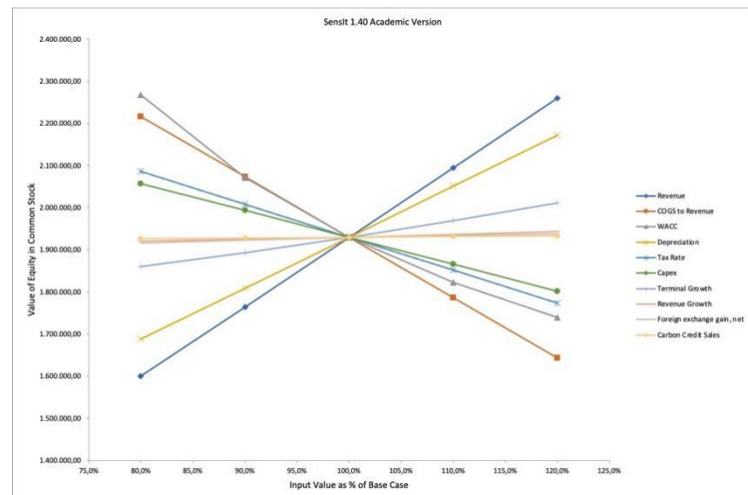
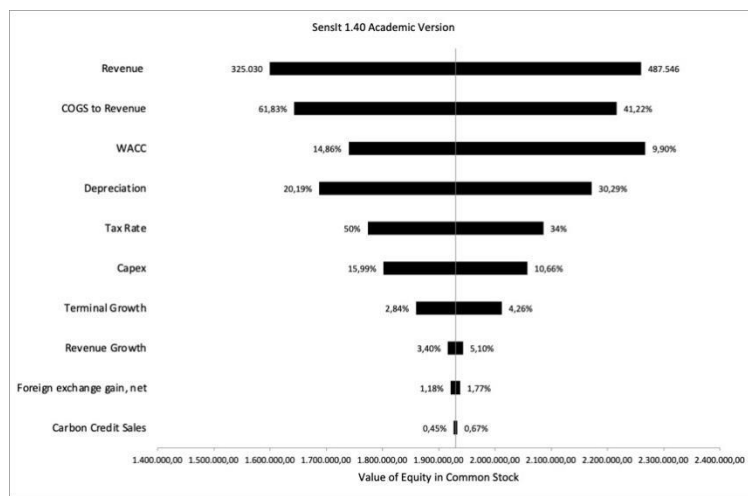
Relative Valuation Model	2019	2020	2021	2022	2023	Average
Earning Per Share	49.922	37.035	43.481	66.026	64.416	52.173
Price Earning Ratio	0.00	0.00	0.00	0.00	19.18	19.18
Valuation	1,001					
Current Share Price	1,195					

PGEO price is Rp. 1,195.00, its EPS is Rp.52,173 and the PER is 19,18. Based on PER comparison, the PGEO's value is also overvalued.

Implementation Plan and Justification

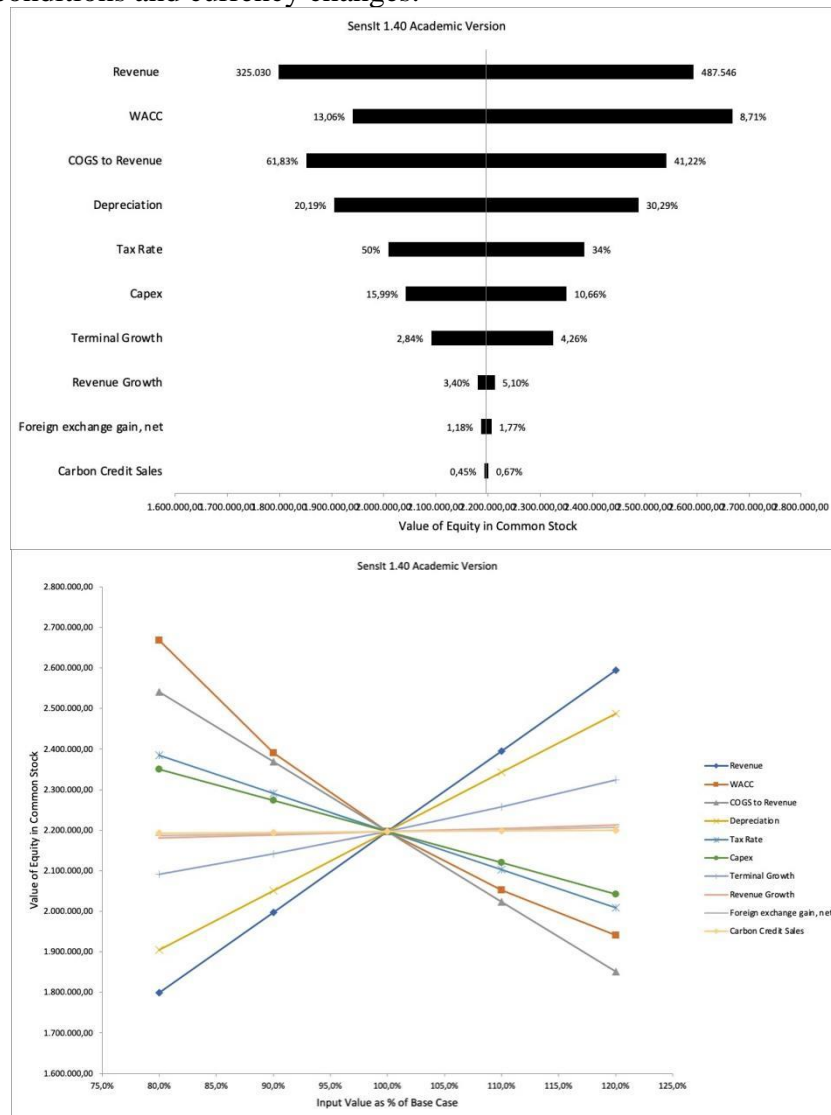
Sensitivity Analysis

The two graphs in the image appear below (Tornado Chart and Spider Chart) to be the results of a sensitivity analysis conducted for a Pertamina Geothermal Energy (PGEO).



In the scenario with a 10-year bond rate, the study highlighted Revenue Growth and the COGS to Revenue ratio as the key drivers of revenue sensitivity. However, the WACC had a different impact on financial stability, most likely reflecting broader market conditions and the interest rates associated with traditional bond financing. Operational decisions based on Capex, Depreciation, and Terminal Growth may have indicated a different strategy orientation, maybe less focused on sustainability activities than the green bond scenario. External factors such as Carbon Credit Sales and Foreign Exchange

Gains continued to have an impact on financial performance, albeit in the context of larger economic conditions and currency changes.



In the scenario involving a green bond, the analysis revealed that revenue sensitivity is substantially dependent on revenue growth and the COGS to revenue ratio, with greater growth rates and lower cost ratios corresponding to higher revenue figures. Financial stability was heavily influenced by the Weighted Average Cost of Capital (WACC), with the usage of a green bond presumably reflecting a reduced WACC due to advantageous terms for sustainable investments. Operational efficiency measures such as Capex, Depreciation, and Terminal Growth revealed strategic investments that were in line with sustainability objectives, potentially showing a focus on green initiatives and sustainable operations. External elements such as carbon credit sales and foreign exchange gains were viewed as new revenue streams and hazards, affecting financial performance in different ways.

While both scenarios indicated similarities in revenue sensitivity and the impact of operational and external factors, the choice between green bonds and regular bond rates had significant implications for financial stability and strategic decision-making. The use of green bonds demonstrated PGE's commitment to sustainability, potentially providing cost savings through reduced WACC while also harmonizing with

environmental goals. In contrast, the 10-year bond rate scenario mirrored traditional financing considerations, with a focus on broader market dynamics and traditional financial risks. Managing these variances properly is critical for PGE's financial performance while balancing sustainability and market competitiveness.

CONCLUSION

PGEO's achievement of one of Indonesia's finest ESG ratings was a key milestone, which was highlighted during its initial public offering. As investor ESG awareness has grown, the company's top sustainable grade from Fitch has become an important consideration. Furthermore, PGEO's growth story, which promises to treble revenue within a decade as stated in its prospectus, enhances its appeal.

However, a thorough examination of PGEO's past financial performance yields critical insights. The valuation results show that PGEO's share price is overvalued. The firm's valuation is Rp. 1,069.00 using the 10-year bond rate, and Rp. 1,221.00 under the Green Bond scenario, both after conversion at Rp. 16,104.12 per USD. This mismatch shows that PGEO's market pricing does not correspond to its intrinsic value.

Furthermore, according to relative valuation, PGEO's stock price is Rp. 1,195.00, with an EPS of Rp. 52,173 and a PER of 19.18. Despite these measures indicating a high market price relative to earnings, PGEO looks to have a higher fundamental or intrinsic worth than its present market price. As a result, the absolute valuation provides a recommended value that reflects the company's future investment potential.

In conclusion, while PGEO has good ESG credentials and ambitious growth possibilities, potential investors should exercise care. The gap between market pricing and fundamental valuations underscores the importance of thorough evaluation and smart investment decisions that prioritize long-term sustainability and financial health.

REFERENCES

- Agarwal, V., Balasubramanian, A., Discha, F., & Tan, K. T. (2024). *Indonesia's green powerhouse promise: Ten bold moves*.
- Casañ, Maria José, Alier, Marc, & Llorens, Ariadna. (2021). A collaborative learning activity to analyze the sustainability of an innovation using PESTLE. *Sustainability*, 13(16), 8756.
- Company, Market Research. (2024). *Mordor IntelligenceTM*. Retrieved June 19, 2024, from <https://www.mordorintelligence.com/>.
- Damodaran, Aswath. (2015). The Small Cap Premium: Where Is the beef? *Business Valuation Review*, 34(4), 152–157.
- Deloitte, S. L. (2023). *New challenges related to ESG factors*. URL: <https://www2.deloitte.com/ce/en/pages/about-deloitte/articles/new-challenges-related-to-esg-factors.html>.
- Diseminasi RUPTL. (2021). *Diseminasi RUPTL 2021-2030*. www.pln.co.id.
- Eierle, Brigitte, Hartlieb, Sven, Hay, David C., Niemi, Lasse, & Ojala, Hannu. (2022). External factors and the pricing of audit services: A systematic review of the archival literature using a PESTLE analysis. *Auditing: A Journal of Practice & Theory*, 41(3), 95–119.
- Elkington, John. (1994). Towards the sustainable corporation: Win-win-win business strategies for sustainable development. *California management review*, 36(2), 90–100.
- Gitman, Lawrence J., Juchau, Roger, & Flanagan, Jack. (2015). *Principles of managerial finance*. Pearson Higher Education AU.
- Grundy, Tony. (2006). Rethinking and reinventing Michael Porter's five forces model. *Strategic change*, 15(5), 213–229.
- IESR. (2022). *Indonesia Energy Transition Outlook 2023: Tracking Progress of Energy Transition in Indonesia: Pursuing Energy Security in the Time of Transition*. Please cite this report as: IESR (2022). Indonesia. www.irena.org.
- Installed geothermal energy capacity. (2024). Retrieved June 19, 2024, from <https://ourworldindata.org/grapher/installed-geothermal-capacity>.
- Li, Ting Ting, Wang, Kai, Sueyoshi, Toshiyuki, & Wang, Derek D. (2021). ESG: Research progress and future prospects. *Sustainability*, 13(21), 11663.
- SODEC, UGM. (2023). *Laporan Social Return on Investmen (SROI) PT Pertamina EP Asset 2 Limau Field 2023*. Universitas Gadjah Mada. Yogyakarta.
- SSE. (2020). *Sustainable Stock Exchanges: ESG Guidance for Listed Companies*. Sustainable Stock Exchanges Initiative.