

**STRATEGIC MANAGEMENT APPROACHES
TO ENHANCING INVESTMENT ATTRACTIVENESS
OF PT PERTAMINA GEOTHERMAL ENERGY (PGEO):
SENIOR MANAGEMENT PERSPECTIVES**



THESIS

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MASTER OF BUSINESS ADMINISTRATION

IPMI INSTITUTE

2026

CERTIFICATE OF APPROVAL

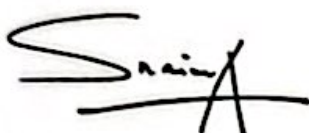
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Investment Attractiveness of PT Pertamina Geothermal
Energy (PGEO): A Senior Management Perspective

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NON-PLAGIARISM DECLARATION FORM

This Thesis is presentation of our original research work. Wherever contribution of others is involved, every effort is made to indicate this clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions.

Also, this work is being submitted in partial fulfillment of the requirements for the Master of Business Administration degree and has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Jakarta, 16 October 2026



Reza Perkasa Alamsyah

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ABSTRACT

This study aims to understand how the investment attractiveness of PT PERTAMINA Geothermal Energy (PGEO) could be improved through the lens of senior management. Qualitative single-case study triangulated documentary review and key informant interviews with results from strategic diagnostic exercises consisting of SWOT analysis, Kepner–Tregoe, 5 Whys, and Fishbone analysis by using dynamic capabilities as the conceptual lens. Results show that PGEO's investment attractiveness is shaped by factors within the company's organizational capabilities and external factors such as institutional setup and market forces. Uncertainty in regulation, tariff/power purchase agreement structure, exploration risk, project execution risk, and single off-taker risk contribute to the gap between the country's geothermal resources' potential and commercially bankable projects. This study suggests improvement of sensing capability by actively monitoring market and regulation development, improvement of seizing capability by increasing financing alternatives and business model diversification, and improvement of transformation capability by stronger governance and decisiveness. This study contributes management-focused recommendations while acknowledging its limited scope and view, as it was not validated with investors and regulators.

Keywords: PGEO dynamic capabilities, strategic diagnostics, investor perception, renewable energy financing, Qualitative Business case study

CHAPTER I

INTRODUCTION

1.1 Research Background

As the global climate crisis worsens and energy transformation takes a new turn toward clean and renewable energy, energy companies are no longer just measured by their operational excellence. Investors now demand they show a compelling, credible and strategic sustainability story. PGEO, PT Pertamina Geothermal Energy as one of Indonesia's key energy transition players sees increasing complexity in elevating its investment appeal locally and abroad. PGEO, as a subsidiary of PT Pertamina Power Indonesia, not only has the mandate for geothermal exploration and production. It is also obliged to help Indonesia commit to reduce carbon emissions and achieve Net Zero Emission (NZE). In market realities, however, geothermal huge potential has yet to be translated into good investor sentiment, given the expectation of transparent governance, mitigation of long-term project risks, and quantifiable ESG performance.

Indonesia's geothermal industry plays a pivotal role in Indonesia's energy transition. Indonesia is estimated to have approximately 40% (forty percent) of the world's geothermal resources and has been utilize about 10% (ten percent) of technically feasible supply deployed as installed capacity. Globally, geothermal development faces high upfront capital costs, upstream risks associated with exploration and drilling, and longer-term risks until these energy sources reach commercial operation. Historically, these factors have made geothermal energy vulnerable to investors' perceptions of governmental policies around regulatory risk, risk sharing, and bankability. Investors include but are not limited to local Indonesian conglomerates as well as international investors. Further-more, FDI and climate finance in NEWRE have been identified as pivotal mechanisms to de-risk early exploration costs, enable deployment of various technologies, and scale up low carbon generation overall. As a result, companies such as PGEO are increasingly being scrutinized based on their capacity to not only provide stable baseload renewable energy, but also their capacity as institutions

to absorb and govern foreign capital, comply with net-zero emissions pledges Indonesia has made, and demonstrate tangible ESG impacts to maintain investment through multiple projects. (Wahid, 2025).

Indonesia witnessed a remarkable achievement in investment realization this year, reaching IDR 1.7 trillion despite the difficult situation that Indonesia has experienced. Investment realization this year was supported by foreign direct investment (FDI) of IDR 900.2 trillion and domestic investment reaching IDR 814 trillion. Such favorable investment realization indicates that investors are positively responsive to the conducive policies introduced by the government this year. As Indonesia transitions into pursuing investment in downstream and renewable-energy-related sectors as national priorities, investors will continue to broaden their opportunity scope while maintaining higher expectations of corporates' readiness and quality of governance. In the view of PGEO, increased investment realization in 2024 means that corporates need to demonstrate transparent risk allocation, project bankability, and ESG credibility to attract investment. Investors see geothermal companies not just as electricity generators, but also as potential contributors to the country's decarbonization transition and green dollars.

In today's strategic management literature, these challenges are framed through the perspective of dynamic capabilities, which involves a firm's "second-and-higher-order ability to purposefully adapt, build, and/or configure its organizational and technological skills through time..." (Teece, 2022:1; also see Correggio, 2024). Dynamic capabilities stress the ability to sense opportunities in the environment, seize those opportunities through strategy and organizational innovation, and transform/reconfigure resources in ways that are path dependent but flexible (Teece, 2022). Furthermore, recent research highlights the fact that sensing, seizing, and transforming can also be applied to sustainability and stakeholder/ESG pressures, helping firms gain organizational legitimacy from investors who value sustainability (Yang, 2022).

In order to diagnose and provide strategic recommendations to improve PGEO's attractiveness to investors this research utilizes four data-driven management tools and strategies. Primarily, in order to establish PGEO's potential issues management-wise, this paper makes use of a managerial diagnostic tool called Kepner-Tregoe Situation Analysis (SOA). SOA will help pinpoint potential opportunities to attract investors by distinguishing between symptoms, events, and underlying root causes of issues investors face. Kepner-Tregoe Problem Analysis, also known as the 5 Why's Technique and Fishbone Diagram will be used to drill down to the root cause of issues pertaining to structure, process, human resources, and governance that may be detrimental to potential investors choosing PGEO's investment portfolio.

The outcome of these tools are taken and categorized under the Dynamic Capabilities framework. For example, identifying green incentives or opportunity to access green finance internationally is considered sensing. Corporate reactions such as doubling down on ESG story, digitalizing sustainability reporting, or improving financial footing is an example of seizing. Changing operations through restructuring of BU's, building strategic partnerships, and revamping risk management systems fall under transforming. Therefore, the framework used to analyze these firms is cyclic and introspective following adaptive strategic management.

Contributions: Theoretically, by integrating strategic diagnostic tools into the Dynamic Capabilities stream of literature, this research furthers theory on how renewable energy firms located in emerging markets can sustainably improve their investment appeal. Managerially, this research hopes to provide strategy recommendations that PGEO's management team can utilize to formulate policies that will be more flexible, agile, and attractive to investors.



Figure 1.1 PERTAMINA Energy Geothermal Business Process

Source: PGE Annual Report 2025

1.2 Problem Statement

Based on the research background state above; the problem of PT Pertamina Geothermal Energy (PGE) strategic role in Indonesia's energy transition and its alignment with national Net Zero Emission (NZE) goals, the company faces persistent challenges in enhancing its investment attractiveness. These challenges stem from a disconnect between the untapped potential of geothermal energy and investor expectations for transparent governance, robust ESG performance, and long-term risk management. In an increasingly sustainability-driven investment landscape, PGE must develop dynamic capabilities to sense market shifts, seize strategic opportunities, and transform internal structures. However, the absence of a coherent, data-driven strategy to address these dimensions has hindered PGE's ability to build investor confidence and legitimacy. This study seeks to diagnose the root causes of these challenges and formulate actionable strategies to position PGE as a credible and competitive player in the global renewable energy market

1.3 Research Questions

Considering all above discussions, the research questions can be constructed as follows:

1. What are the internal and external factors influencing investor interest in PT Pertamina Geothermal Energy (PGEO) within the context of the renewable energy sector?
2. How does PGEO develop its dynamic capabilities, specifically sensing, seizing, and transforming—to enhance investment attractiveness?
3. How can the integration of strategic analyses with the Dynamic Capabilities framework be utilized to formulate strategies for improving investment attractiveness?
4. What managerial strategies are most appropriate and contextually relevant for PGEO to strengthen investor perception and increase long-term financing opportunities?

1.4 Research Objectives

The purpose of this study is to develop adaptive dynamic capability based corporate strategy to increase investor attractiveness in PT Pertamina Geothermal Energy (PGEO) during the energy transition period and expectation from capital market. This research specifically study:

1. To analyse the internal and external factors that influence investor perceptions of PGEO as a business entity in the renewable energy sector.
2. To Identify and assess PGEO's dynamic capabilities (sensing, seizing, transforming) as they respond to strategic changes in the business environment.
3. To Provide strategic formulations to improve investment attractiveness under the lens of strategic diagnosis and Dynamic Capabilities approach.

4. To provide recommendations that will position PGEO for strategic and managerial decision-making around building long-term relationships with investors.

1.5 Research Scope and Limitations.

The research aims to identify strategic measures to increase investment appeal of geothermal companies, using PT PERTAMINA Geothermal Energy (PGEO) as a case study. Design of methodology and approach grounded in Dynamic Capabilities framework- sensing, seizing, transforming dimensions, the study tries to answer how PGEO can strategically respond to investors needs based on industry trends towards sustainability.

This research scope encompasses factors that affect investor sentiment towards the company from within and outside the organization, use of strategic problem-solving tools (Kepner-Tregoe, Fishbone, SWOT) to identify appropriate management strategies to increase appeal to investors through ESG signalling, governance and long-term finance potential.

The recommendations were made on how PGEO can strategically increase their investment appeal. Nonetheless, it is important to note several limitations of this study. First, due to the nature of this research as a single-case study, broad generalizations to the renewable energy industry or to other companies cannot be provided. Second, due to data collection being done through publicly available sources and interviews, it was difficult to fully understand the thoughts and feelings of investors as well as the nitty-gritty of strategic processes. Third, given the constraints of the semester, it was difficult to gauge long-term impacts of certain strategic decisions or market reactions. With that said, this research aims to provide useful insights for PGEO's strategy as well as the academic community.

1.6 Research Contributions

1.6.1 Academic Contribution

This research provides academic enrichment of the Dynamic Capabilities concept under renewable energies industry in emerging markets framework. Moreover, it proposes a multilevel strategic diagnostic tool in terms of investment attractiveness research.

1.6.2 Practical Contribution

The study provides data- and theory-informed recommendations for PGEO's management to formulate effective investment attraction strategies and assists investors in evaluating the company's readiness to address sustainability-related challenges.

1.7 Thesis Structure

This thesis is structured into five chapters, each designed to ensure clarity and coherence in presenting the research that can facilitates the reader's understanding of the research content

Chapter I – Introduction

This chapter establishes the foundational context for the study by examining the strategic challenges faced by PT Pertamina Geothermal Energy (PGEO) within Indonesia's geothermal energy sector. It begins with a comprehensive background that situates PGEO in the broader landscape of global climate action and Indonesia's energy transition, highlighting the increasing importance of sustainability narratives in attracting investment. The chapter introduces the theoretical lens of Dynamic Capabilities, framing PGEO's strategic imperatives around sensing market shifts, seizing opportunities, and transforming internal structures to enhance investor legitimacy.

Chapter II – Literature Review

This chapter focuses on diagnosing the root causes of the strategic challenges faced by PT Pertamina Geothermal Energy (PGEO) in enhancing its investment attrac-

tiveness within Indonesia's geothermal energy sector. Through the application of multiple analytical tool including SWOT Analysis, Kepner-Tregoe Situation and Problem Analysis using 5 Why's methodology, Fishbone Diagram, and Pareto Analysis. This chapter systematically identifies and prioritizes internal and external factors that hinder investor confidence.

Chapter III – Research Methodology

This chapter outlines the methodological framework adopted to investigate the strategic challenges and investment dynamics within Indonesia's geothermal energy sector. It presents a structured approach encompassing research design, data collection, and data analysis techniques, all aligned with the study's qualitative orientation.

Chapter IV – Research Finding and Discussion

This chapter summarizes the collected data and presents the analysis results. It explains the implications, interpretations, and applications of the research findings. It also covers an analysis of the current situation and potential future conditions of PGEO strategy.

Chapter V – Conclusion and Recommendations

The final chapter provides an overview of the research by restating the problem, summarizing the research procedures, and presenting the main findings. It also offers actionable recommendations based on the research results.

References and Bibliography

This section lists all the sources and materials referenced in the thesis. The references are organized alphabetically, allowing readers to explore the scientific basis of this study.

CHAPTER II

LITERATURE REVIEW

This chapter explores the root causes of the research problem through a series of analytical methods, including SWOT analysis, the Kepner-Tregoe method, fishbone diagram, and Pareto analysis. The outcomes of these analyses will then be aligned with relevant theoretical perspectives drawn from scholarly journals, established frameworks, and supporting literature. Based on the literature review, a conceptual framework will be developed to serve as the scientific foundation of this study.

2.1 Situation Analysis

2.1.1 Situation Appraisal

Situation Appraisal is one of several decision analysis methods that makes up the Kepner-Tregoe (KT) rational process. Created by Charles H. Kepner and Benjamin B. Tregoe, the KT rational problem-solving and decision-making process is a widely respected method for tackling complex decisions. This popular decision-analysis method, outlined in their book, *The New Rational Manager*, helps managers cut through complexity, identify problems and properly prioritize tasks (Kepner & Tregoe, 1981).

The intent of Situation Appraisal is to "sort through the clutter". This clutter happens when you are dealing with a complex business or operational challenge. It is not meant to PGEO have the problems, but to clear away the underbrush so you can direct your energies to where they will have the greatest positive effect. There are a few discrete steps that are used to accomplish this:

1. **Identify Concerns:** The initial stage is the process of identifying and listing all existing issues, concerns, opportunities, and threats. The objective is to move all potential problems from informal discussion and place them into a visible, structured format for analysis.

2. **Separate and Clarify:** Complex issues are often a combination of several smaller, distinct problems. This step requires managers to break down large issues into more specific and manageable components, ensuring that each problem is clearly defined.
3. **Set Priority:** Acknowledging that not all issues have the same level of urgency or impact, KT proposes evaluating each clarified issue based on three criteria: Timing (how urgent is this issue?), Trend (is this situation getting better or worse?), and Impact (how significant are the consequences?). This evaluation process allows for objective and rational priority setting, ensuring that resources are focused on the most critical areas.
4. **Determine Next Steps:** Once priorities are established, the final step is to determine the appropriate action for each priority issue. KT categorizes the next steps into more specific analyses: Problem Analysis (to find the cause), Decision Analysis (to choose the best solution), or Potential Problem Analysis (to prevent future risks).

2.1.2 Identifying Key Challenges

A comprehensive situation appraisal of Indonesia's geothermal sector reveals numerous interconnected challenges spanning financial, market, regulatory, and legal domains.

Financial and Commercial Barriers: Geothermal projects require significant upfront capital investment, particularly for exploration and drilling, which can consume up to 50% (fifty percent) of project costs. Limited commercial finance is available for the early stage high-risk exploration phase of geothermal projects since private entities do not typically want to assume the risk of exploration independently. Additionally, geothermal must compete for market share with lower-cost renewables such as solar and wind. These renewables compete for the same renewable energy carve-outs and may draw away policy support and financing.

Market and Tariff Structure Issues: Issues can also arise from the market structure itself. Uncertain long-term tariff levels as well as intermittent government incentives can impact bankability and project payback periods. With few or no alternative power off-takers/commercial buyers or pre-existing merchant-market structures in place, projects are often forced into customized long-term PPAs that may not appropriately reflect the changing economics of the grid over time. This results in significant reliance on a single off-taker, PT Perusahaan Listrik Negara (PLN), creating minimal negotiating power for developers on tariff levels and continued concerns over PLN's creditworthiness or payment delays.

Regulatory, Policy, and Legal Hurdles: The policy environment is characterized by instability, with frequent revisions to geothermal licensing regulations and tariff schemes that lead to shifting cost-recovery parameters in the middle of a project's development cycle. Administratively, there is also conflicting mandates between ministries with jurisdiction (i.e., energy, forestry, mining). In addition, there is a lack of centralization in the issuance of permits which allows each province to issue permits based on different requirements, further delaying timelines. Unclear land-use designations within the law (i.e. areas where geo-thermal fields intersect with protected areas or forestry land) have also caused legal challenges and lengthy delays.

2.1.3 Identification of Short-Term Critical Issues

From this broad landscape, a number of near-term hurdles can be distilled from this overview. On regulation and permitting, unclear allocation of responsibility between central ministries and provincial regulators has resulted in permitting backlogs. Unclear local-level requirements can also cause key-site preparation and environmental permits to stall. On financing, risk sharing instruments are not commercially available, forcing developers to self-finance expensive seismic and gradient surveys. There are also no government-backed guarantees or supports for pre-drilling expenditures, resulting in prolonged investment phase timelines. For offtake, benchmark conditions to renegotiate PPAs with PLN are not well-defined, such as when dealing with

inflationary pressures. Furthermore, being subject to a single-buyer concentrates risk for developers and weakens negotiating positions, passing on credit-risk premiums to finance. On the social dimension, engaging with stakeholders too late in the project development process has led to community resistance and protests near drill sites. This is because there are no industry standard practices for benefit sharing.

2.1.4 Prioritization of High-Impact Issues for Intervention

Detailed findings highlight four (4) areas for improvement that would benefit the sector greatly if focused on strategically.

a. Regulatory and Permitting Delays

Streamlining duplicative permitting processes and clearing permitting backlog ranks high on the list. This would significantly reduce lengthy development timelines (which can take up to six years just to break ground) and free up hundreds of megawatts of stalled capacity. Speeding up environmental and spatial permits via an integrated Online Single Submission (OSS) would cut approval times from eighteen (18) months down to five (5) days, thereby boosting investor confidence and accelerating time to revenue.

b. Exploration Financing and Risk Mitigation

The second priority is unlocking commercial risk sharing instruments to support exploration. Grants, concessional loans, or insurance products, as well as stand-alone exploration guarantees would allow developers to take tens of millions of dollars in upfront seismic and gradient survey costs off their balance sheets. De-risking exploration directly results in accelerated site selection, bankable project proposals sooner, and a reduced cost of capital, enabling new field appraisals to pencil commercially and unleashing a new wave of early stage investments.

c. Power Purchase Agreement (PPA) Negotiations and Single-Buyer Exposure

Tackling the difficulties inherent in PPA discussions is essential. Formulating explicit, inflation-adjusted rate standards in Power Purchase Agreements (PPAs) and striving to diversify PLN's off-take framework would mitigate the credit-risk premiums levied on developers due to the existing single-buyer system. Enhancing the transparency of indexation and force-majeure distributions in the current PPA's Regulation 10/2017 can bolster cash-flow predictability, diminish financing expenses, and allow private entities to get debt under more advantageous conditions..

d. Stakeholder Conflicts and Benefit-Sharing Frameworks

Finally, carefully overseeing community interactions is crucial. Transitioning stakeholder engagement to the first stages of projects and incorporating uniform benefit-sharing provisions into license contracts will avert expensive land-use conflicts and societal unrest that can impede drilling and cause prolonged delays. The execution of cohesive community development initiatives, bolstered by local grievance panels, would foster trust, get the social license to operate, and guaranty uninterrupted project progression devoid of conflicts affecting PGEO's reputation.

2.2 Competitive Analysis: The SWOT Analysis Framework

2.2.1 Origins and Components

SWOT analysis is a widely recognized strategic planning tool used to evaluate the strategic position of an organization or a sector by identifying key internal and external factors (Helms & Nixon, 2010). Its development is commonly attributed to Albert Humphrey, who led a research project at the Stanford Research Institute (SRI) in the 1960s and 1970s. The framework is designed to provide a structured overview that can inform strategic decision-making (Panagiotou, 2003).

The framework is composed of four distinct elements, which are categorized based on their origin:

1. Internal Factors (Strengths and Weaknesses): These factors are intrinsic to the entity being analysed and are within its direct sphere of influence.
 - Strengths are the internal attributes, resources, and capabilities that give the entity a competitive advantage or support the achievement of its objectives.
 - Weaknesses are the internal attributes and resource limitations that place the entity at a competitive disadvantage or hinder its performance.
2. External Factors (Opportunities and Threats): These factors originate from the macro-environment and are largely beyond the direct control of the entity.
 - Opportunities are external conditions and trends in the environment that the entity could potentially leverage to its advantage.
 - Threats are external conditions and trends that could jeopardize the entity's strategy, performance, or viability.

2.2.2. Strategic Application and Critiques

The primary utility of SWOT analysis lies in its ability to facilitate the formulation of strategy. By systematically mapping the four (4) elements, decision-makers can identify strategic fits. A more advanced application of this is the TOWS Matrix, developed by Weirich (1982), which explicitly links internal and external factors to generate four distinct strategic postures: SO (maxi-maxi) strategies that use strengths to seize opportunities; WO (mini-maxi) strategies that address weaknesses by taking advantage of opportunities; ST (maxi-mini) strategies that leverage strengths to mitigate threats; and WT (mini-mini) strategies that are defensive and aim to minimize both weaknesses and threats.

Despite its widespread use, the SWOT framework has been subject to significant academic critique. Hill and Westbrook (1997), in a notable study, found that SWOT analysis was often conducted without rigor and rarely led to actionable strategies, labelling it a "*laundry list*" of unstructured points. Other common criticisms include its tendency to be overly simplistic, its failure to prioritize the factors identified, and its static nature, which provides only a snapshot in time without accounting for the dynamic evolution of the business environment (Helms & Nixon, 2010). Furthermore,

the distinction between the four categories can sometimes be ambiguous, leading to subjective and inconsistent application (Panagiotou, 2003).

However, when used as a preliminary diagnostic tool rather than a prescriptive one, SWOT analysis remains a valuable method for organizing complex information and initiating strategic conversations. For the purpose of this study, the framework is employed to provide a foundational, structured overview of the Indonesian geothermal landscape, acknowledging its limitations while leveraging its utility as a powerful organizing framework.

2.2.3 Application: SWOT Analysis of the Indonesian Geothermal Business Landscape.

After establishing the theoretical basis of the SWOT framework, the subsequent section utilizes this model to evaluate the strategic stance of the Indonesian geothermal energy industry.

Internal Factors: Strengths

- a. Extensive Geothermal Reserves: The country harbors some of the globe's most substantial high-enthalpy geothermal resources, constituting a notable natural asset for sustainable energy generation.
- b. Assured Market need: As an emerging nation with persistently increasing electricity requirements, there exists a reliable need for energy. This requirement is formalized via the state-owned entity, PT Perusahaan Listrik Negara (PLN), which serves as the appointed off-taker, guaranteeing a consistent market for geothermal energy producers.
- c. Robust Government Endorsement: The industry receives considerable governmental assistance, chiefly facilitated by PLN's function as the assured purchaser. This assistance is augmented by other financial incentives, such as tax allowances, exemptions on import tariffs for essential equipment, and the provision of viability gap funds, all of which contribute to lowering the effective costs of project development.

d. Regional Human Capital: An essential internal resource is the availability of proficient local expertise, comprising engineers and professionals possessing extensive, practical knowledge in the geothermal sector. This diminishes reliance on global specialists and enhances domestic capabilities.

Internal Factors: Weaknesses

a. High Financial and Technical Risk: Geothermal projects carry high capital expenditure (CAPEX) and high drilling risks when compared to other renewable energy sources such as wind and solar.

b. Complex Bureaucratic Processes: The permitting and licensing process is especially complicated, with overlapping authority between central government agencies (across several ministries) and regional governments. This bureaucratic complexity adds to project lead times and increases soft-cost budgets.

c. Single Off-Taker Dependency: The industry's reliance on PLN as the PGEOe government off-taker presents a structural vulnerability. Under this arrangement, developers have limited bargaining power in tariff negotiations and are also exposed to the off-taker's credit risk and payment delays.

d. Inadequate Stakeholder Management: Failure to conduct thorough stakeholder mapping at the early stages and a lack of robust benefit-sharing mechanisms may lead to social conflicts with local communities, potentially resulting in delays in critical drilling and construction phases.

External Factors: Opportunities

a. Global Leadership and Investment Magnet: Indonesia holds approximately 40% of the world's total geothermal reserves, with an estimated potential of 24 GW. The country already ranks second globally in installed capacity (≈ 2.6 GW), a position that has helped attract USD 8.7 billion in investments over the past decade.

b. Active Project Pipeline: There are currently twelve major geothermal projects open for development, requiring a total investment of USD 2.14 billion. These projects offer

diverse entry points for new investors and provide significant scope for joint ventures, particularly for the development of the Listrik Desa (sub-urban electricity network) program.

c. Access to Climate Finance: The global focus on decarbonization provides access to various international climate finance mechanisms. These include instruments such as carbon credits, green bonds, and funding from multilateral development banks, which can lower financing costs and help de-risk project cash flows.

External Factors: Threats

a. Geological Uncertainty: A primary operational threat is the risk of unexpected sub-surface conditions during exploration and drilling, which can significantly escalate project budgets and push out payback timelines.

b. Social and Legal Conflicts: Land tenure disputes and community opposition, particularly in volcanic or culturally sensitive areas where resources are often located, can stall exploration and trigger costly, prolonged legal battles.

c. Regulatory Instability: Regulatory uncertainty stemming from frequent revisions to geothermal licensing and tariff policies serves to undermine project timelines and erode investor confidence.

d. Off-Taker Risk Exposure: The heavy dependence on PLN as the PGEOe off-taker also functions as a major external threat. This exposes developers to risks such as rigid tariff caps, the off-taker's credit risk, and potential delays in payment that are beyond the developer's control

2.3 Problem Analysis

Problem Analysis of Geothermal Business Development in Indonesia

This chapter conducts a systematic problem analysis of the challenges confronting the geothermal energy sector in Indonesia. Utilizing a situation appraisal methodology, it begins by identifying a broad spectrum of issues and concerns that impact business development. The analysis then narrows its focus to the most critical short-term issues before prioritizing a set of high-impact areas where targeted interventions could unlock significant progress.

2.3.1 Root Cause Analysis using the 5 Whys Methodology

To systematically diagnose the origin of the project's financial underperformance, this analysis employs the 5 Whys methodology. This deductive technique is instrumental in moving beyond superficial symptoms to explore the deeper cause-and-effect relationships that culminate in a specific problem. By repeatedly asking "Why?", the analysis peels back layers of causality to reveal the foundational issue that must be addressed for a sustainable solution. The investigation begins with the most immediate symptom the project's poor financial returns and proceeds through a deductive chain of inquiry. The initial question addresses the direct cause of the stated problem: the payback period is extended because the total capital expenditure (CAPEX) ran significantly over the original budget. This immediately reframes the issue from one of long-term revenue underperformance to one of acute, upfront cost overruns. The subsequent inquiry pinpoints the source of this overspend: the CAPEX exceeded the budget primarily because drilling costs escalated well beyond initial estimates. This finding is critical as it PGEO the financial distress to a specific operational area, indicating that the overruns were not systemic across the project but concentrated in the high-cost, high-risk drilling phase. Understanding this leads to the next logical question regarding the technical drivers of the cost escalation. The analysis reveals that the escalation in drilling costs was due to unforeseen geological conditions; specifically, the production and injection wells turned out to be deeper and hotter than anticipated. This deviation from the engineering plan necessitated a costly technological pivot, requiring the deployment of more expensive, specialized drilling rigs and higher-grade casing materials designed to withstand extreme temperatures and pressures.

This discovery exposes a critical flaw in the project's planning phase: the geological models failed to predict these conditions because the initial subsurface study was fundamentally inadequate, relying on limited seismic lines and an insufficient number of temperature gradient holes. The data foundation upon which the entire drilling strategy and budget were built was not robust enough to provide an accurate characterization of the geothermal reservoir. The final inquiry uncovers the strategic deci-

sion that led to this technical vulnerability: the scope of the subsurface study was intentionally restricted as a result of the project's financing structure, which capped exploration spending to minimize upfront risk for investors. This decision prioritized short-term capital preservation over long-term project certainty, resulting in the completion of only the minimum survey required by regulation rather than a comprehensive geological assessment essential for accurate engineering and financial planning.

2.3.2 Root Cause

This systematic inquiry concludes that the ultimate root cause of the project's extended payback period is a strategic underinvestment in comprehensive reservoir characterization, a decision driven by conservative budget allocations aimed at mitigating investor risk aversion. In essence, the attempt to avoid upfront exploration risk directly created a much larger, and ultimately realized, risk of construction-phase cost overruns.

2.3.2.1 Ramifications of the Root Cause

The consequences of this foundational issue are not isolated to past performance; they create a cascade of ongoing risks that threaten the project's future viability: Continued Financial Risk: The most immediate consequence is the high probability of continued cost overruns on future wells if the underlying reservoir uncertainty is not reduced through further study. Each new well represents a gamble rather than a calculated investment, perpetuating the cycle of budget misses.

Increased Operational Risk: The project faces higher operational risks stemming from unanticipated thermal and pressure conditions, which could compromise equipment longevity, increase maintenance costs, and pose potential safety hazards, thereby impacting long-term asset integrity.

Strained Stakeholder Relationships and Reputational Damage: The project's credibility is severely damaged. This leads to strained relationships with lenders and equity partners as financial forecasts are repeatedly missed, eroding trust and making future fundraising efforts more challenging and costlier.

2.4 Fishbone Analysis

2.4.1 Origins and Conceptual Framework

Fishbone analysis, also known as the Ishikawa diagram or cause and effect diagram, was developed by Kaoru Ishikawa (Cause-and-Effect Fishbone, 2023) in the 1960s as a quality control tool to systematically identify root causes of problems. This analysis originally applied in industrial settings, its structured visual format has since been adapted across various domains including healthcare, behavioural science, and strategic management. The diagram organizes potential causes into categories such as Methods, Machines, Materials, and Manpower, which can be tailored to suit different analytical contexts. Wong et al. (2016), in *Quality Improvement in Behavioural Health*, emphasized the diagram's utility in identifying barriers and facilitators to behavioural change, integrating it with tools like FMEA and PDIA to enhance diagnostic depth.

Kumah et al. (2023) demonstrated its effectiveness in multidisciplinary brainstorming sessions, showing how teams use the Fishbone diagram to uncover systemic issues and improve service delivery. Furthermore, Gartlehner et al. (2017) explored its adaptation for visualizing systematic review results, finding that it improved comprehension among non-expert stakeholders. These studies illustrate the diagram's versatility and its growing relevance in strategic communication and managerial decision-making. When applied to investor perception and long-term financing strategies, the Fishbone framework can help managers diagnose underlying factors such as market positioning, financial transparency, governance, and stakeholder engagement. By reframing traditional categories to reflect strategic drivers, leaders can use the diagram to align internal efforts with investor expectations and uncover actionable insights for sustainable growth.

CHAPTER III

RESEARCH METHODOLOGY

In chapter 3, a detailed and systematic discussion about the methodology used in this study is presented. The first issue is the research design, which is a qualitative business case approach with a single case study design. This is considered appropriate to conduct comprehensive research on the complex challenges and strategic landscape of the geothermal energy business sector in Indonesia. The “case” is the sector itself and the unit of analysis is composed of the political, economic, social, technological, environmental and legal factors and the internal operational issues that affect its development.

3.1. RESEARCH DESIGN

There is a need to evaluate the effectiveness of existing business and policy approaches in this sector holistically, not only based on measurable outcomes but also on a thorough comprehension of the context in which the interlinked barriers to development occur.

3.2 DATA COLLECTION METHOD

This qualitative study utilizes in-depth focus group discussion with key informants as its primary method for data collection.

Qualitative interviewing, pioneered by Glaser and Strauss (1967), facilitates an open-ended and in-depth exploration of aspects of life about which the interviewee has significant experience and insight (Charmaz, 2008). The primary aim is to have participants describe their experiences and explain the rationale behind their actions and perceptions (Rubin & Rubin, 2012). This process is inherently collaborative; both the interviewer and interviewee engage in a co-constructive process of meaning-making, working together to reconstruct not only personal experiences but also shared knowledge (Brinkmann & Kvale, 2015).

3.3 Define Source Person

In this study, the source person are Director of Project and Operation of PT PERTAMINA Power Indonesia as a Holding company of PERTAMINA Geothermal Energy (hereafter referred to as COO OP PPI), the Director of Operation of PT PERTAMINA Geothermal Energy Tbk (hereafter referred to as COO OE PGEO) and Senior Advisor of Board's Director of PT PERTAMINA Geothermal Energy (hereafter referred to as SA PGEO) of PGEO. As a member of the top management team, they pose comprehensive knowledge of the company's strategic direction, operational performance, project portfolio, and key challenges in developing geothermal assets. This position is directly involved in translating corporate strategy into operational initiatives, monitoring efficiency and reliability of geothermal operations, and aligning internal capabilities with regulatory requirements and investor expectations, so that the insights provided are highly relevant for understanding PGEO's investment attractiveness.

3.3.1 Subject of the Research

The subject of this research is the expert assessment of PGEO's investment and strategic position in Indonesia's geothermal sector as viewed from the perspective of COO OP PPI and COO OE PGEO. The study explores how they evaluates the bankability and risk–return profile of geothermal projects, the impact of tariff policies and PPA arrangements, the implications of exploration and operational risks, and the role of operational excellence initiatives in strengthening PGEO's competitiveness for domestic and international green capital. These insights are used to capture an investor-oriented and internally grounded picture of PGEO's current position and future potential.

3.3.2 Research Subject Identification

The subject research is specifically identified as the Director of Project and Operation of PT PERTAMINA Power Indonesia and Director of Operational Excellence of PT PERTAMINA Geothermal Energy Tbk (COO OE PGEO), who serves as the key informant in this study.

3.3.3 Criteria for Informant Selection.

The selection process is a well-structured multi-stage process to ensure recruitment of suitable participants. The first step is to define and identify the target population, which is often divided into appropriate groups according to the research plan. In the second stage, a set of specific selection criteria, which may include professional performance, subject matter expertise, and other relevant attributes, is applied to this population to produce a shortlist of potential candidates. The last phase is the recruitment of informants from this refined list.

It is important to point out that qualitative research is not constrained by the statistical requirement of a minimum sample size but rather emphasizes the depth and quality of information (Creswell & Poth, 2018). The sample size is determined based on two main principles, adequacy and suitability. Data collection is usually continued until data saturation is attained, i.e. new interviews do not yield new themes or insights, indicating that the informational capacity of the sample has been reached (Guest, Bunce, & Johnson, 2006; Lincoln & Guba, 1985).

3.4 Data Analysis Method

In this study, a descriptive analysis method is employed to process, analyse, and present the qualitative data. This approach aligns with the primary objective of descriptive research, which is to characterize a phenomenon and its attributes. Rather than focusing on causality, descriptive research emphasizes the "what" aspect of an issue, and for this reason, methods like observation and interviews are frequently utilized for data collection (Gall, Gall, & Borg, 2007). Descriptive qualitative methods

are well-established and widely adopted across various disciplines, including education, psychology, and the social sciences (Nassaji, 2015). The analysis of the collected data follows a systematic, multi-stage process.

3.4.1 Coding – labelling and organising

The fundamental step in the analysis is coding, which is the process of labeling and organizing qualitative data to identify different themes and the relationships between them. Saldaña (2015) defines a code as a “word or short phrase that symbolically assigns a summative, salient, essence-capturing and/or evocative attribute for a portion of language-based or visual data.” The main benefit of coding is to establish a systematic inventory of the data breaking up long text into digestible chunks. This organization is the fundamental basis for more comprehensive and systematic research and for drawing clear conclusions.

3.4.2 Categorization

Following the initial coding process, the next step is categorization, which involves classifying or clustering related codes. This process helps the researcher move from granular data points to identifying broader patterns and themes, transforming a potentially chaotic heap of data into a structured, insightful narrative. This enhances the overall understanding of the phenomenon and facilitates clear communication of the results. The classification of codes into categories should not be an arbitrary exercise; rather, it should be guided by the study's literature framework and specific research questions (Creswell & Poth, 2018).

3.4.3. Content Analysis

After the first round of coding, the next step is to cluster or group related codes together. This allows the researcher to move from granular data points to identifying broader patterns and themes, turning a potentially chaotic heap of data into a structured,

insightful narrative. This leads to a better overall understanding of the phenomenon and allows to communicate results clearly. The classification of codes into categories should not be an arbitrary exercise but should be informed by the literature framework of the study and the specific research questions (Creswell & Poth, 2018)..

3.4.4. Narrative Synthesis

The final step of the analytic process is narrative synthesis. This process consists of weaving the results of the data processing and analysis into clear, integrated and comprehensive information that gives descriptive meaning. Popay et al. (2006) describe narrative synthesis as being primarily based on words and text to synthesize and explain the findings, with a textual approach to “tell the story” of the results from the included data. The synthesis provides an overview and interpretation of the findings that can serve as a basis for evaluation, discussion and the formulation of recommendations

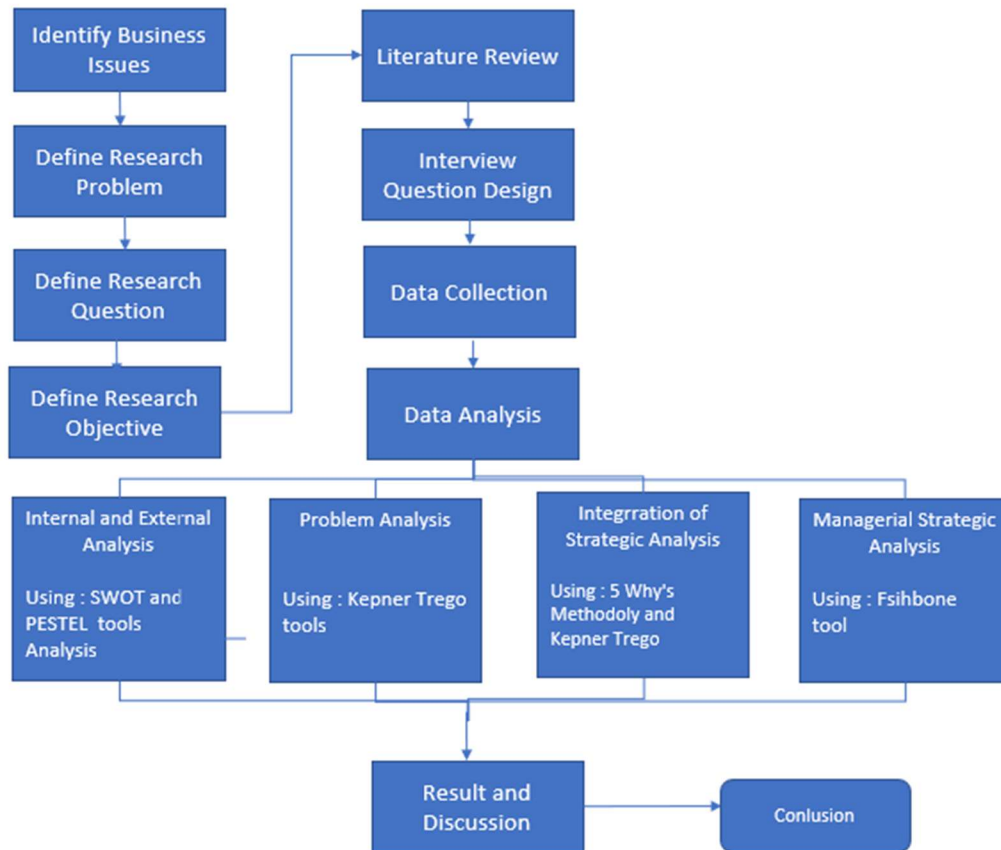


Figure 1.2: Data analysis methodology flowchart

CHAPTER IV

RESEARCH FINDINGS AND DISCUSSION

This chapter presents an in-depth narrative analysis of the empirical material gathered through a comprehensive interview with the Director of Operation and Project (COO OP) of PT PERTAMINA Power Indonesia and Director Operational Excellence (COO OE) of PT PERTAMINA Geothermal Energy Tbk (PGEO). As key informant of this study, both COO's provide a uniquely situated perspective from within the upper management structure of Indonesia's largest geothermal developer. The insights generated from this conversation are systematically interpreted to address the four research questions and to fulfil the corresponding research objectives established in Chapter 1.

Rather than presenting the findings as segmented themes or rigid analytical fragments, this chapter adopts a narrative interpretive approach, allowing the informant's reflections to unfold as a coherent account of PGEO's strategic position. In line with qualitative inquiry, interpretation is interwoven with empirical extracts that anchor the analysis in the lived expertise of the informant. The structure of this chapter is therefore both analytical and narrative: analytical because the findings are interpreted through the conceptual lenses of the Dynamic Capabilities Framework and strategic diagnostic tools (Kepner–Tregoe, Fishbone, SWOT), and narrative because it preserves the temporal, reflective, and sense-making nature of the informant's articulation.

Through this integrated approach, the chapter addresses (1) the internal and external factors influencing investor interest in PGEO, (2) the development of PGEO's dynamic capabilities, (3) the integrative use of strategic diagnostic tools and Dynamic Capabilities in formulating strategic options, and (4) managerial strategies that enhance investor perceptions and long-term financing opportunities.

4.1 Understanding the Forces Shaping Investor Interest in PGEO

The first research question is to identify the internal and external factors that influence investor interest in PGEO. A clear insight from the informant is that investor interest is not anchored merely in resource availability or technical potential, but in the commercial logic through which geothermal projects become bankable or fail to do so. The COO OE is premised on a fundamental premise that geothermal is “capital intensive, high risk, and long tenor.” This triad frames investor calculation from the earliest stage of engagement. According to the COO OE, investors are looking at geothermal with a clear understanding that “commerciality is still heavily dependent on government support, particularly through incentive schemes and tariff policy,” and that tariff structures in Indonesia have not yet integrated the real cost profile of geothermal development.

This insight points to an important dynamic: investment attractiveness is less about the physical geothermal potential and more about the policy, pricing and contractual mechanisms which determine if capital can flow with reasonable certainty. The COO OP states point-blank that, “The existing tariff and regulatory structure means that ‘many investors see geothermal as less competitive than solar or wind. The comparative disadvantage is a constant refrain throughout the conversation.

The COO further explains that this comparative disadvantage is compounded by a range of inter-related strategic issues faced by PGEO including bankability issues under current tariff and PPA conditions, execution and timeline risks associated with long project development cycles and the difficulty of financing early stage exploration where subsurface uncertainty remains high. These are further aggravated by operational risks such as steam supply variability and structural dependency on external parties, especially PLN as the single buyer, permitting authorities and policy alignment across agencies, all of which increase perceived investment risk and depress valuation

4.1.1 Internal Strengths as a Foundation for Investor Confidence

From the standpoint of internal organizational factors, PGEO possesses a number of strengths that naturally appeal to investors. The COO articulates this clearly: PGEO “possesses the largest and most extensive geothermal Working Area portfolio in Indonesia,” and benefits from “strong institutional backing from PERTAMINA,” as well as “over 40 years of experience in geothermal exploration, drilling, and operation.” These attributes collectively constitute a technical and institutional credibility that positions PGEO as a stable and competent actor within the renewable energy sector.

Investors appraise firms not only based on resource potential but also on organizational reliability, execution capability, and the likelihood that a company can deliver the expected returns across long time horizons. PGEO’s legacy and size therefore function as internal strengths that enhance investor confidence.

4.1.2 Internal Weaknesses That Constrain Investment Attractiveness

Yet the informant is just as blunt about the internal flaws still distorting investor views. “PGEO also has difficulty achieving strong commerciality across its project portfolio, compounded by the challenge of securing tariff agreements that are reflective of the cost structure of geothermal.” PGEO’s COO says the company is now “refining its commercial strategies, negotiation frameworks and internal coordination” to tackle this challenge, showing an awareness that improving internal capability is key to attracting investor interest.

4.2 How PGEO Develops Dynamic Capabilities: Sensing, Seizing and Transforming

The second research question deals with the development of dynamic capabilities (sensing, seizing and transforming) of PGEO to increase the attractiveness of investment. The COO’s story provides a glimpse into an organization that is increasingly

aware of the need for adaptive strategic behavior in a volatile policy and market environment.

4.2.1 Sensing: Reading Global Signals and Anticipating Future Opportunities

PGEO's sensing capability exhibits a strong outward orientation. "PGEO tracks global benchmarking and is part of international geothermal platforms to identify and monitor trends in green investment," COO OE says. These include attending global conferences, partnering with international associations, and regularly analyzing policy developments abroad.

This involvement enables PGEO to "anticipate future opportunities in fields like direct-use applications, critical mineral extraction and green hydrogen" demonstrating that sensing is not only about monitoring but also about forward-looking interpretation.

But the COO is also aware of the limitations of PGEO's current sensing systems, adding that information flows on investor sentiment and regulatory changes are "reactive rather than preventive." This candid admission reflects an organizational awareness of the gap between current sensing practices and the robust intelligence systems needed in a dynamic energy market.

At the same time, the COO notes that PGEO's sensing function increasingly incorporates macro-financial signals, including interest rate movements, FX volatility, and broader energy price dynamics. Higher global interest rates raise the cost of capital for long-tenor geothermal projects, while USD-IDR fluctuations amplify CAPEX risk due to imported equipment. These macroeconomic signals are actively monitored because they shape investor hurdle rates and influence comparative assessments between geothermal and alternative renewables.

4.2.2 Seizing: Mobilizing Organizational Resources to Capture Value

PGEO has invested heavily in enhancing its seizing capability, in addition to sensing. The creation of a specific Investor Relations function is described as an essential step toward greater transparency, credibility and communication. The COO explains that Investor Relations “manages communication with investors, analysts and financial institutions,” ensuring messaging consistency and strategic clarity.

PGEO’s ESG leadership is a mechanism for capturing. The COO says the recognition as the world’s top geothermal ESG performer “significantly enhances investor perception,” enabling PGEO to turn perceived opportunities in the green finance ecosystem into strategic advantage.

Seizure also happens at the operational and community levels through CSR programs, local engagement, and media visibility – mechanisms that build stakeholder trust and reputational strength.

PGEO’s increased focus on transparency and communication based on milestones is also a reflection of seizing efforts. “Investors are increasingly looking for project-by-project visibility with clear milestones, an execution dashboard and regular updates on risks, dependencies and mitigation plans,” says the COO. Investors need frequent and visible proof points to avoid a valuation discount even if the long-term fundamentals are sound

4.2.3 Transforming: Structural, Governance and Organizational Adaptation

PGEO’s transforming capability is visible in its transition from an SOE subsidiary to a publicly listed company. This transition required “upgraded governance structures, new compliance mechanisms, and strengthened internal processes,” which collectively modernized PGEO’s organizational architecture. The COO describes this transformation as “a significant structural change that aligns PGEO with capital market expectations.”

Yet transformation is not only structural. The COO notes gradual shifts in culture, process integration, and cross-functional coordination—subtle but crucial aspects of dynamic capability development. The organization is actively learning to navigate regulatory uncertainty, PPA negotiations, ESG reporting demands, and multi-stakeholder engagement processes.

These findings answer Research Question 2 and fulfil the second research objective by illustrating how PGEO builds, deploys and evolves dynamic capabilities to remain competitive and attractive to investors.

However, the COO candidly observes that transformation remains constrained by internal factors such as limited specialist depth, key-person dependency, uneven project control capabilities, and complex cross-functional coordination. Decision-making processes can be slow, accountability across project milestones is not always clearly defined, and stage-gate discipline, procurement lead times, and risk registers are not yet applied consistently across the portfolio. These organizational frictions reduce PGEO's ability to de-risk projects early and weaken its capacity to counterbalance external uncertainties.

4.3 Integrating Strategic Analyses with Dynamic Capabilities: Foundations for Strategy Formulation

The third research question asks how the integration of strategic tools with the Dynamic Capabilities framework can be utilized to formulate strategies for improving investment attractiveness. The empirical findings show that PGEO's investment environment is defined by complex, interlocking causal patterns that cannot be captured adequately by a single analytical tool. Instead, the integration of these tools serves as a holistic diagnostic process that aligns with PGEO's dynamic capabilities.

4.3.1 Kepner-Tregoe and Fishbone: Mapping Situations and Root Causes

The COO's narrative aligns closely with the logic of Kepner–Tregoe's Situation and Problem Analysis. The key situation is the persistent gap between geothermal resource potential and its commercial attractiveness. The problem deviates from expected performance when projects stall or fail, resulting in “capital write-offs, shrinking project pipelines, and delays in meeting capacity and revenue targets.” The informant identifies the primary root cause as uncertainty in tariff approval and PPA negotiations, describing it as “the central barrier to bankability.”

A Fishbone analysis would further categorize root causes into policy design failures, market structure deficiencies, contract negotiation asymmetries, capital constraints, and regulatory bottlenecks.

4.3.2 SWOT: Strategic Positioning within Structural Realities

The SWOT analysis is substantiated through the COO's detailed reflections. PGEO's strengths (portfolio size, technical expertise, institutional backing, ESG performance) coexist with internal weaknesses (commercial viability challenges, negotiation constraints). Opportunities include geothermal direct use, mineral extraction, and hydrogen production, while threats emerge from regulatory instability, PLN's monopoly, and cost competition from solar and wind.

Integrating SWOT with Dynamic Capabilities reveals which strengths PGEO can seize, which weaknesses require transformation, and which opportunities can be sensed and pursued. Together, these tools help PGEO articulate a strategy that is not only diagnostic but also adaptive, addressing Research Question 3 and achieving the third research objective.

The SWOT diagnosis is further sharpened by recognizing underutilized external opportunities, including deeper private and IPP participation, expanded use of green loans, bonds, or sukuk to lower the cost of capital, and more intensive use of strategic

partners for co-investment and credibility enhancement. Beyond power generation, the COO points to emerging value pools such as geothermal direct-use applications, critical mineral extraction from geothermal brine, green hydrogen and ammonia production, and off-grid or captive-use models that reduce reliance on PLN. These opportunities remain largely untapped but hold strategic potential to diversify revenue streams and strengthen investment attractiveness.

4.3 Toward Contextual Managerial Strategies for Strengthening Investor Perception

The final research question asks what managerial strategies are most appropriate and contextually relevant for PGEO to strengthen investor interest and secure long-term financing. The findings suggest several pathways grounded in the dynamic capabilities PGEO is developing.

First, PGEO must continue strengthening its sensing systems, particularly regulatory intelligence, investor analytics and market scanning. The COO acknowledges that current systems are “reactive rather than preventive,” indicating that improved sensing capabilities would equip PGEO to anticipate regulatory changes, investor shifts and financial risks before they materialize.

Second, PGEO should enhance its seizing capabilities by deepening investor engagement, improving tariff negotiation strategies, leveraging its ESG leadership and diversifying business models. The expansion into direct-use geothermal applications, mineral extraction and green hydrogen production represents strategic opportunities that PGEO is already beginning to sense and must now seize.

Third, PGEO must continue its transformational trajectory, particularly in governance, organizational culture and decision-making agility. Transforming into an organization that can negotiate effectively within Indonesia’s complex policy environment is essential for sustaining investor interest. These strategies collectively respond to Research Question 4 and fulfil the fourth research objective.

The COO also emphasizes that improving investor perception requires stronger integration between project governance, capital allocation, and de-risking strategies. Current challenges arise when CAPEX commitments accelerate before sub-surface and regulatory risks are sufficiently reduced, or when funding strategies by project stage remain unclear. Addressing these gaps would enable PGEO to present a more coherent investment narrative, align internal controls with investor expectations, and progressively narrow the proof-point gap that continues to affect valuation.

4.5 Synthesis: A Coherent Narrative of Strategic Constraint and Adaptive Possibility

The narrative presented throughout this chapter reveals an organization operating at the intersection of structural constraint and strategic possibility. PGEO's investment attractiveness is shaped by powerful external forces—regulatory stability, macroeconomic conditions, legal frameworks, market structures—over which it has limited direct control. Yet PGEO's internal strengths, technical legacy, institutional backbone and emerging dynamic capabilities position it well to adapt, innovate and attract long-term investment.

Through sensing, seizing and transforming, PGEO demonstrates increasing strategic maturity. Through the integration of analytical tools with strategic insight, it is possible to chart a path toward enhanced investment attractiveness that is both grounded in Indonesia's policy realities and aligned with global geothermal trends.

Seizing capabilities are reflected in PGEO's strategic efforts to leverage its ESG leadership, strengthen investor relations, and explore new commercial pathways beyond conventional electricity generation. Initiatives such as geothermal direct-use applications, critical mineral extraction from geothermal brine, and green hydrogen or ammonia production represent attempts to convert sensed opportunities into monetizable value. At the same time, the findings indicate that seizing is closely tied to credibility and communication. Investors increasingly expect milestone-based disclosure, project-level transparency, and clear articulation of execution risks and mitigation strat-

egies. Without consistent and visible proof points, strategic initiatives struggle to translate into improved investor confidence.

Transforming capabilities are most evident in PGEO's transition to a publicly listed company. This shift has required substantial changes in governance, disclosure practices, compliance systems, and performance orientation. These changes signal an emerging organizational culture aligned with capital market expectations. Nonetheless, the interview reveals persistent internal frictions, including key-person dependency, uneven project control maturity, complex cross-functional coordination, and limited agility in decision-making. These constraints slow early-stage risk mitigation and weaken PGEO's ability to reconfigure resources rapidly across projects, underscoring the ongoing nature of organizational transformation.

The integration of strategic analytical tools further enriches this capability-based interpretation. Kepner–Tregoe analysis clarifies the situational problem by highlighting deviations from expected outcomes, such as project delays, stalled negotiations, and declining investor confidence. Fishbone analysis exposes the multi-causal structure underlying these problems, including policy design weaknesses, regulatory fragmentation, negotiation asymmetries, and market architecture constraints. SWOT then consolidates these insights into a coherent strategic profile, revealing how internal strengths intersect with external opportunities and how internal weaknesses are amplified by external threats.

Importantly, the SWOT analysis also highlights underutilized opportunities identified by the COO, including deeper private and IPP participation, greater use of project-level financing, expanded green loans, bonds, or sukuk, and diversification into non-PLN-dependent business models. Opportunities such as off-grid applications, geothermal by-products, and industrial direct use offer strategic avenues to reduce concentration risk and enhance long-term investment appeal. Viewed through the Dynamic Capabilities lens, these opportunities require enhanced sensing, decisive seizing

through partnerships and financing innovation, and continued organizational transformation.

Taken together, the findings contribute to scholarly debates on renewable energy investment and strategic management in emerging markets. They demonstrate that geothermal investment attractiveness cannot be explained solely through economic or resource-based arguments. Instead, it requires a capability-based and institutionally grounded understanding of how firms navigate regulatory complexity, market asymmetry, and investor expectations. Organizational learning, regulatory interpretation, and cross-functional coordination emerge as strategic assets in their own right, extending Dynamic Capabilities theory into contexts characterized by strong state influence and market imperfection.

4.6 Discussions.

The empirical findings in Chapter 4 and discusses them through the theoretical lenses adopted in this study, especially the Dynamic Capabilities framework and the suite of strategic analytical tools comprising Kepner – Tregoe, Fishbone, SWOT. The discussion is a combination of narration of the Director Operational Excellence of PT PERTAMINA Geothermal Energy Tbk (PGEO) and is framed in the larger academic dialogs on investment attractiveness, organizational capability building, and strategic management in regulated renewable energy markets.

The results are indicative of the fact that the investment attractiveness of PGEO is not determined by a single dominant variable but rather by the interaction of internal organization-al capabilities, market structures, regulatory dynamics and macroeconomic conditions. All through the interview the COO insists that you cannot judge the investment attractiveness of geothermal only on technical, geological or resource considerations. But the real problem, according to the informant, is what he calls a commerciality gap, that is a structural mismatch between the vast potential of Indonesia's geothermal resources and the economic, regulatory and contractual conditions that render geothermal projects financially viable to investors.

The commerciality gap reflects a systemic challenge arising from the coexistence of high capital intensity, long development cycles, high exploration risk, tariff uncertainty and a market design where PLN is both single buyer and single off-taker. Such conditions create an investment environment where the internal strengths of PGEO cannot be fully translated into bankable outcomes. Investors are not just worried about value, but that they can see risk-adjusted returns under the current assumptions of tariffs and PPAs, implementation timelines and early-stage risk sharing mechanisms. This has meant geothermal projects have often been viewed as less attractive than alternatives such as solar or wind, which have shorter lead times and clearer commercial profiles. From an internal perspective, the findings confirm that PGEO possesses substantial strengths that should, in principle, support strong investor confidence. These include deep technical expertise, long operational experience, institutional backing from the PERTAMINA Group, a large and diversified geothermal working area portfolio, and a strong reputation in environmental, social, and governance performance. These resources provide PGEO with a solid foundation for value creation and long-term competitiveness.

However, the interview reveals that these strengths remain under-realised due to constraints imposed by the external institutional environment. Even highly capable organizations struggle to convert internal resources into investment appeal when regulatory frameworks, tariff mechanisms, and contracting processes do not support value capture. This finding aligns closely with Dynamic Capabilities theory, which argues that competitive advantage in volatile and regulated environments depends not on resource ownership alone, but on the firm's ability to reconfigure, deploy, and align those resources with changing external conditions.

This challenge becomes particularly salient in the post-IPO context. Following its public listing, PGEO faced a marked shift in investor expectations—from long-term strategic narratives to concrete and frequent proof points. Investors increasingly demand evidence of on-time commercial operation dates (COD), stable operational output, disciplined execution, and consistent cashflow growth. Periods surrounding key

milestones thus become critical moments of credibility assessment. In the absence of visible progress or when signals of delay, policy ambiguity, or operational volatility emerge, investors tend to maintain valuation discounts regardless of the firm's underlying strengths. This highlights that internal capabilities must be accompanied by credible execution signals to influence investor perception.

Externally, PGEO operates within an institutional environment characterised by regulatory uncertainty, multi-layered licensing processes, inconsistent policy implementation, macroeconomic volatility, and evolving investor preferences toward ESG-oriented assets. These conditions significantly shape investor risk perception. The COO's account resonates strongly with institutional theory, which emphasizes that infrastructure investment decisions depend heavily on regulatory predictability, policy coherence, and mechanisms that reduce long-term uncertainty.

A critical institutional feature highlighted in the findings is the asymmetric market structure created by PLN's position as the sole off-taker. Although tariff ceilings exist, actual tariff outcomes remain subject to prolonged negotiation and PLN approval, effectively positioning geothermal developers as price takers. This imbalance limits the effectiveness of firm-level capability improvements, as even well-prepared commercial proposals are constrained by factors beyond managerial control. Consequently, investment risk remains elevated despite improvements in governance, ESG performance, and operational capability.

Dynamic Capabilities provide a powerful organizing framework for understanding how PGEO responds to these constraints. The findings show that PGEO has developed meaningful sensing capabilities through global benchmarking, participation in international geothermal platforms, engagement with green finance ecosystems, and monitoring of policy developments. The organization also observes macro-financial signals such as interest rate movements, foreign exchange volatility, and energy price dynamics, recognizing their influence on the cost of capital and investor decision-making.

ing. However, these sensing activities remain partially reactive and fragmented, limiting PGEO's ability to anticipate regulatory and market shifts in a fully integrated manner.

Seizing capabilities are reflected in PGEO's strategic efforts to leverage its ESG leadership, strengthen investor relations, and explore new commercial pathways beyond conventional electricity generation. Initiatives such as geothermal direct-use applications, critical mineral extraction from geothermal brine, and green hydrogen or ammonia production represent attempts to convert sensed opportunities into monetizable value. At the same time, the findings indicate that seizing is closely tied to credibility and communication. Investors increasingly expect milestone-based disclosure, project-level transparency, and clear articulation of execution risks and mitigation strategies. Without consistent and visible proof points, strategic initiatives struggle to translate into improved investor confidence.

Transforming capabilities are most evident in PGEO's transition to a publicly listed company. This shift has required substantial changes in governance, disclosure practices, compliance systems, and performance orientation. These changes signal an emerging organizational culture aligned with capital market expectations. Nonetheless, the interview reveals persistent internal frictions, including key-person dependency, uneven project control maturity, complex cross-functional coordination, and limited agility in decision-making. These constraints slow early-stage risk mitigation and weaken PGEO's ability to reconfigure resources rapidly across projects, underscoring the ongoing nature of organizational transformation.

The integration of strategic analytical tools further enriches this capability-based interpretation. Kepner–Tregoe analysis clarifies the situational problem by highlighting deviations from expected outcomes, such as project delays, stalled negotiations, and declining investor confidence. Fishbone analysis exposes the multi-causal structure underlying these problems, including policy design weaknesses, regulatory fragmentation, negotiation asymmetries, and market architecture constraints. SWOT

then consolidates these insights into a coherent strategic profile, revealing how internal strengths intersect with external opportunities and how internal weaknesses are amplified by external threats.

Importantly, the SWOT analysis also highlights underutilized opportunities identified by the COO, including deeper private and IPP participation, greater use of project-level financing, expanded green loans, bonds, or sukuk, and diversification into non-PLN-dependent business models. Opportunities such as off-grid applications, geothermal by-products, and industrial direct use offer strategic avenues to reduce concentration risk and enhance long-term investment appeal. Viewed through the Dynamic Capabilities lens, these opportunities require enhanced sensing, decisive seizing through partnerships and financing innovation, and continued organizational transformation.

Taken together, the findings contribute to scholarly debates on renewable energy investment and strategic management in emerging markets. They demonstrate that geothermal investment attractiveness cannot be explained solely through economic or resource-based arguments. Instead, it requires a capability-based and institutionally grounded understanding of how firms navigate regulatory complexity, market asymmetry, and investor expectations. Organizational learning, regulatory interpretation, and cross-functional coordination emerge as strategic assets in their own right, extending Dynamic Capabilities theory into contexts characterized by strong state influence and market imperfection.

CHAPTER V

CONCLUSION AND RECCOMENDATIONS

5.1 Conclusion

This study concludes that PGEO's investment attractiveness is fundamentally shaped by the interplay between internal organizational capabilities and the external institutional environment. PGEO's internal strengths—including its experienced workforce, extensive geothermal portfolio, and global leadership in ESG performance—provide a strong foundation for competitive positioning. However, these strengths are insufficient to offset persistent regulatory ambiguity, tariff structures misaligned with geothermal economics, and a market configuration dominated by a single off taker.

Enhancing investment attractiveness therefore requires a deepening of PGEO's dynamic capabilities. Strengthening sensing mechanisms will enable the organization to anticipate regulatory, financial, and technological shifts more proactively. Improving seizing capabilities demands refined investor communication, clearer execution signaling, and diversification into new business models that reduce dependency on traditional power offtake structures. Continued transformation remains essential to align internal governance, decision-making agility, and project controls with the expectations of global capital markets.

The integration of Kepner–Tregoe, Fishbone, and SWOT with the Dynamic Capabilities framework offers a comprehensive foundation for strategic formulation. While each tool provides distinct diagnostic insights, the Dynamic Capabilities perspective ensures that strategy remains adaptive rather than static. This approach highlights the importance of continuous organizational learning, flexibility, and cross-functional alignment for firms operating in regulated renewable energy industries.

The study carries important implications for policymakers, practitioners, and scholars. Policymakers must recognize that geothermal investment will not scale without predictable, transparent, and investor-sensitive regulatory frameworks. Practitioners can benefit from adopting capability-oriented strategies that strengthen credibility under institutional constraint. For scholars, the study demonstrates the value of integrating institutional analysis with Dynamic Capabilities theory to explain firm behavior in politically embedded and uncertain environments.

The research acknowledges its limitations, particularly the reliance on a single key informant and the contextual specificity of the findings. Future research could triangulate perspectives across regulators, financial institutions, and project developers, or conduct cross-country comparisons of geothermal investment dynamics. Longitudinal studies may further illuminate how dynamic capabilities evolve in response to policy reform and market change.

Ultimately, PGEO's future competitiveness will depend on its ability to sense strategically, seize decisively, and transform continuously. As Indonesia accelerates its low-carbon transition, PGEO occupies a pivotal position as both an operational leader and a strategic actor shaping the geothermal sector. This study concludes that enhancing investor attractiveness requires not only technical excellence but also adaptive strategic leadership capable of navigating institutional complexity and articulating a compelling long-term value proposition to the global investment community.

5.2 Recommendations.

The study identifies two main barriers to the attractiveness of geothermal investment: external barriers related to tariff and offtake design, and internal barriers related to the translation of institutional credibility into bankable, on time project execution. Hence, it is recommended that PERTAMINA and PGEO adopt a dual track approach, which at the same time gives priority to both external commercial bankability and internal execution capacity. For the external front, future efforts should focus on advocacy for geothermal specific tariff reforms and standardized PPA clauses through

a coordinated policy working group with PLN and MEMR. Complementary measures could include pilot offtake guarantees such as government backed floor tariffs or partial payment guarantees during early project years. In addition, the creation of blended finance vehicles that integrate concessional finance, multilateral development bank support, green bonds and export credit or foreign exchange cover. These mechanisms would reduce the weighted average cost of capital in general and act as a hedge against currency and equipment risk exposure.

At the same time, PGEO needs to strengthen its internal commercial and permitting capabilities. This could be through a PPA playbook, risk allocation matrix and investor data room to standardize commercial offers; establishing a dedicated negotiation team with clear KPIs; and staged development and stage gate financing supported by drilling insurance to limit exposure in the early stages. Institutional credibility can be enhanced further through the establishment of a Permitting and Community Unit to help with approvals, negotiate MOUs with the relevant ministries and roll out local benefit programs. Third party verification would also help in leveraging ESG credentials to gain access to sustainability linked loans and in widening the investor base. To demonstrate the viability of these reforms, PGEO should pilot one to two flagship projects that showcase new commercial and financing structures while improving investor communications with regular milestone reporting on drilling results, COD progress, and ESG metrics. These would boost investor confidence and draw long tenor institutional capital.

In addition to practical recommendations, this study opens the way for further research. Future research should examine the commerciality gap in geothermal investment via comparative studies with other renewable sectors, and identify ways to address structural gaps in tariff design, risk sharing and financing. Research could also extend the applicability of Dynamic Capabilities theory to regulated energy markets, investigating how sensing, seizing and transforming capabilities evolve under conditions of regulatory asymmetry and institutional uncertainty, and whether predictive regulatory intelligence frameworks can improve organizational adaptiveness. Future research can consider the role of investor perception and signaling particularly the impact

of milestone-based disclosure, project transparency and ESG communication on valuation outcomes in post IPO energy firms. Institutional and market structure research could focus on the long-term implications of PLN's single buyer model versus multi off taker frameworks in other jurisdictions to identify potential reforms to reduce negotiation asymmetry and improve tariff predictability

Organizational transformation also warrants deeper exploration, especially in understanding how geothermal firms can overcome internal frictions such as key person dependency and limited project control maturity to accelerate capability deployment. Diversification pathways merit closer examination, including the commercial viability of geothermal by products such as critical minerals, hydrogen, and ammonia, as well as off grid and industrial direct use applications that reduce reliance on PLN. Comparative international benchmarking could provide valuable insights by analysing geothermal investment frameworks in countries such as the Philippines, Kenya, and Iceland, and assessing how global green finance instruments—such as bonds, sukuk, and ESG linked loans—can be adapted to Indonesia's context. Finally, future research may extend the integration of strategic analytical tools (Kepner–Tregoe, Fishbone, SWOT) into longitudinal studies, enabling scholars to track how problem structures and strategic responses evolve over time, and to develop hybrid models that combine capability based and institutional perspectives for a more holistic understanding of investment attractiveness in emerging renewable energy markets.

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APPENDIX I. MAPPING OF INTERVIEW ITEMS TO ANALYTICAL FRAMEWORKS

This appendix presents the mapping of interview items used in the COO Operational Excellence PGEO questionnaire to the four analytical frameworks employed in this study, namely: (1) the Kepner–Tregoe framework (Situation & Problem Analysis), (2) the SWOT framework, and (4) the Dynamic Capabilities framework (sensing, seizing, transforming). This mapping illustrates how each interview question was designed to elicit insights related to strategic context, external environmental conditions, competitive positioning, and the firm’s dynamic capabilities in enhancing investor interest in PGEO’s geothermal projects.

a. Situation Analysis

The following items were formulated to capture the strategic situation, problem context, impacts, and affected stakeholders:

A1 – Identifies the key strategic issues associated with PGEO’s investment attractiveness.

(Expanded scope from the additional interview: bankability/commerciality under tariff–incentive–PPA conditions, execution/timeline risk affecting IRR and credibility, early-stage funding constraints for exploration drilling, operational/resource risk such as steam variability/outages affecting output and cashflow, dependency on external parties including PLN processes and permitting, and concentration/single-buyer exposure.)

A2 – Explores when and under what circumstances the challenges or decline in investor interest emerged.

(Expanded scope from the additional interview: the post-IPO shift from “story” to proof points—on-time COD, stable output, and cashflow growth; heightened sensitivity around milestone windows such as COD deadlines and major approvals/tenders;

investor reactions to schedule uncertainty, policy/tariff questions, and short-term operational volatility.)

A3 – Describes the most significant impacts of this situation on project continuity and the achievement of investment targets.

(Expanded scope from the additional interview: project re-phasing toward “ready” projects; more expensive financing with higher hurdle rates and tighter terms; increased reliance on concessional/structured financing; elevated risk to capacity growth targets if COD additions slow; stronger trade-offs in CAPEX allocation toward bankable/low-delivery-risk projects.)

A4 – Identifies the internal and external stakeholders most affected by the situation.

(Expanded stakeholder detail from the additional interview: internal stakeholders—Board/management, Finance–Treasury–Investor Relations, Project/Drilling/EPC teams, and Operations/Reservoir teams; external stakeholders—investors/analysts, lenders/DFIs, PLN/offtakers, regulators/permitting agencies, contractors/partners, and local communities.)

D15 – Explores PGEO’s core competitive advantages from the perspective of investors (e.g., WKP portfolio, technical expertise, Pertamina group support).

(Expanded scope from the additional interview: market leader scale and resource access, baseload renewable value, revenue visibility via long-term offtake contracts, a multi-year growth roadmap with named projects/milestones, strong backing and partner credibility, and green finance readiness through ESG/green financing frameworks.)

D18 – Identifies relevant external threats (e.g., competitors, substitutes, regulatory changes) that form part of the overall risk situation.

(Expanded scope from the additional interview: competition for capital/talent/rigs/EPC capacity; rapid scaling of solar + battery storage as a cheaper/faster substitute; social

license risk; regulatory uncertainty and changes in procurement/tariff interpretation; macro risks such as higher rates or FX volatility that weaken geothermal risk-return.)

b. Problem Analysis

These items focus on diagnosing the problem, its root causes, and why previous interventions failed to achieve optimal outcomes:

B5 – Identifies the primary causes of PGEO’s low investment attractiveness. (Expanded causes from the additional interview: persistent bankability concerns; difficulty financing exploration due to high subsurface risk and limited risk-sharing; execution and timeline risk reducing IRR and credibility; heavy external dependency across permits, PLN readiness, land/forest approvals, and community acceptance; a “proof-point gap” where investors demand frequent visible milestones; and competitive pressure from faster/cheaper renewables.)

B6 – Examines structural factors contributing to the issue (e.g., PLN’s monopoly/monopsony role, pricing schemes, market design).

(Expanded structural logic from the additional interview: unequal negotiation due to PLN as single off taker; developers as price takers; regulations providing tariff ceilings but not guaranteed prices; any tariff below the ceiling still requiring negotiation and PLN approval, prolonging contracting and weakening bankability; limited incentives for PLN to prioritize geothermal; absence of mandatory geothermal-specific offtake and insufficient risk-sharing mechanisms.)

B7 – Identifies internal factors (human resources, organizational structure, communication, internal regulations, processes) that contribute to the problem.

(Expanded scope from the additional interview: limited specialist depth and key-person dependency; gaps in project controls and contract management; slow decisions and unclear accountability per milestone; complex cross-functional coordination; insuffi-

cient project-by-project milestone dashboards and inconsistent explanation of risks/dependencies/mitigation; weak stage-gates, procurement lead times, inconsistent change control and risk registers; uneven permitting capability and inconsistent community engagement; unclear PLN interface ownership; CAPEX ramping before de-risking is complete; unclear funding plan by project stage; limited structured risk-sharing integrated early.)

B8 – Reviews prior interventions or initiatives and explains why their outcomes were suboptimal.

(Expanded scope from the additional interview: multiple negotiation rounds, revised tariff proposals, and stronger economic justification efforts; outcomes constrained by structural market imbalance and PLN bargaining power; absence of guaranteed tariff pricing and limited regulatory compulsion for geothermal offtake; lack of systemic risk-sharing instruments to improve bankability.)

C9 – Examines the influence of government regulations and policy frameworks on PGEO’s projects and investor interest.

(Expanded scope from the additional interview: the centrality of tariff rules, incentives, procurement design, and PPA terms to bankability; investor caution when policy outcomes are unclear or slow to implement; enabling policy priorities include PPA standardisation, government guarantees/risk-sharing mechanisms, and faster, consistent permitting.)

C10 – Identifies macroeconomic factors (e.g., energy price volatility, interest rates, exchange rates) affecting project bankability.

(Expanded scope from the additional interview: higher interest rates raise cost of capital and reduce project value; FX volatility increases imported equipment and FX-linked debt risk; energy price dynamics shape perceptions of renewable procurement pace—

cheap coal/gas can slow renewable momentum while higher fossil costs increase geothermal attractiveness.)

C14 – Examines legal and licensing barriers that hinder investor interest (e.g., forest area permits, conservation zones, spatial planning restrictions).

(Expanded scope from the additional interview: complex and time-consuming permitting across land/forest permits, AMDAL, and multi-agency approvals; investor wait-and-see behaviour even when reforms exist, due to inconsistent implementation across projects and regions.)

SWOT Framework

The following items correspond to the SWOT dimensions used to assess PGEO's strategic position in attracting investors:

Strengths (S)

D15 – PGEO's internal strengths, such as geothermal working area portfolio, Pertamina group backing, and extensive technical experience.

(Expanded from the additional interview: category leader credibility, baseload renewable advantage, revenue visibility through long-term offtake, growth roadmap with named milestones, and green finance readiness.)

Supported by related items C13, EB21, and EB22, which highlight ESG performance, sustainability reputation, and commitments to transparency and governance.

Weaknesses (W)

D16 – Internal weaknesses affecting investment attractiveness, including limitations in project commercial viability or contract negotiation flexibility.

(Expanded from the additional interview: single-buyer/concentration exposure, high

capex and long timeline risk, high exploration uncertainty, JOC complexity, and policy/tariff sensitivity.)

B5–B7 – Dependence on external support (e.g., government/PLN), and weaknesses in communication, negotiation, project controls, and internal alignment.

(Expanded from the additional interview: weak stage-gates, inconsistent risk registers/change control, procurement lead times, unclear accountability per milestone, and CAPEX ramping prior to de-risking completion.)

EA20 – Limited systems for monitoring investor preferences and regulatory developments, indicating reactive rather than proactive capabilities.

(Expanded from the additional interview: insufficient milestone dashboards and inconsistent project-by-project transparency.)

Opportunities (O)

D17 – Opportunities for new business models, such as direct-use applications, mineral extraction (e.g., lithium, silica), green hydrogen/ammonia production, and captive/off-grid development.

(Expanded from the additional interview: deeper private/IPP participation through JVs and project-level financing, expanded green loans/bonds/sukuk, stronger PPA standardisation/guarantees, and deeper strategic partner co-investment.)

EA19 – Opportunities arising from global green investment trends and engagement in international sustainability platforms.

Threats (T)

D18 – External threats such as regulatory uncertainty, frequent policy shifts, and competition from lower-cost renewables (e.g., solar, wind).

(Expanded from the additional interview: solar + storage as a fast-scaling substitute;

competition for rigs/EPC/talent; social license risk; macro risks raising WACC and weakening geothermal risk-return.)

C9–C14 – Regulatory complexity, licensing constraints, negative public perceptions, and macroeconomic pressures that reduce investor appetite.

Dynamic Capabilities Framework

This framework maps how PGEO (1) senses opportunities and threats, (2) seizes opportunities through strategic action, and (3) transforms internal resources and structures.

a. Sensing

EA19 – How PGEO identifies and monitors trends in green investment, global benchmarks, conferences, and international platforms.

EA20 – Systems and mechanisms used to track investor preferences and regulatory developments.

C9–C13 – PGEO’s understanding of regulatory dynamics, macroeconomic conditions, public sentiment, technological advancement, and ESG expectations.

A1–A4 – Identification of strategic issues, impacts, and affected stakeholders, reflecting PGEO’s ability to sense emerging challenges.

A2 / C10 – Sensitivity to post-IPO investor proof-point demands and macro-financial signals (interest rates, FX volatility) that alter risk-adjusted return expectations and financing terms.

b. Seizing

EB21 – Strategic initiatives to strengthen corporate image and credibility with investors (e.g., investor relations, communication strategies, CSR).

EB22 – Responses to ESG and transparency requirements through sustainability reporting and governance enhancement.

D17 – Plans for capturing new business opportunities (direct-use, mineral extraction, green hydrogen/ammonia, captive use).

C12 – Adoption of technologies and digital systems to meet investor expectations for transparency and accountability.

D15 – Mobilisation of internal strengths (assets, technical expertise, organisational support) to exploit identified opportunities.

A3 / B5 – Strategic project re-phasing and CAPEX allocation decisions to prioritise bankable projects and maintain credibility under execution/timeline risk.

c. Transforming

EC23 – Structural transformation processes related to PGEO’s status as a publicly listed company, governance strengthening, and organisational realignment.

EC24 – Organisational readiness to adapt to the evolving investment landscape, including constraints and opportunities as part of a state-owned enterprise subholding.

B7 – Strengthening internal capabilities (cross-functional communication, negotiation abilities, technical–commercial–regulatory alignment) as part of reconfiguring dynamic capabilities.

B7 / C12 – Institutionalization of stage-gates, project controls, risk registers, procurement discipline, and integrated digital reporting to close the “proof-point gap” and improve investor confidence.

APPENDIX II. INTERVIEW RESPONSES OF COO OPERATIONAL EXCELLENCE ON PGEO'S INVESTMENT ATTRACTIVENESS

Interview with COO of PGEO

A1. What are the key strategic issues currently faced by PGEO in relation to its investment attractiveness?

From an investor's perspective, the central strategic issue is commerciality. This applies to any business, but it is particularly critical in geothermal, where projects are capital-intensive, high-risk, and long-tenor. For PGEO, commerciality is still heavily dependent on government support, especially through incentive schemes and tariff policy. The current tariff regime does not yet allow investors and developers to achieve sufficiently attractive risk-adjusted returns. As a result, many investors perceive geothermal as less competitive than other renewables such as solar or wind, which have lower upfront costs and clearer pricing mechanisms.

A second key issue is access to project financing, especially in the early stages. The exploration phase requires very large upfront capital outlays, particularly for exploration drilling, while the resource risk remains very high. Many commercial banks are reluctant to finance this phase without guarantees, risk-sharing mechanisms, or strong government backing. The combination of high upfront cost, high subsurface risk, and limited risk-sharing instruments significantly reduces PGEO's overall investment attractiveness.

In summary, PGEO's strategic issues are centered on three main aspects: (1) geothermal projects that are not yet sufficiently bankable under current tariff and incentive structures; (2) inadequate de-risking and financing support for early-stage exploration; and (3) the perception that geothermal risk–return profiles are less appealing than those of alternative renewable investments.

From an investor's perspective, the central strategic issue is commerciality. This is true

for any business, but it is especially critical in geothermal, where projects are capital-intensive, high-risk, and long-tenor. For PGEO, commerciality is still heavily dependent on government support, particularly through incentive schemes and tariff policy. The current tariff regime does not yet provide sufficient room for investors and developers to achieve returns that are attractive on a risk-adjusted basis. As a result, many investors perceive geothermal as less competitive compared to other renewables such as solar or wind, which have lower upfront costs and clearer pricing mechanisms. A second key issue is access to project financing, especially in the early stages. The exploration phase requires very large upfront capital outlays, most notably for exploration drilling, while the resource risk is still very high. Many commercial banks are reluctant to finance this phase without guarantees, risk-sharing mechanisms, or strong government backing. This combination of high upfront cost + high subsurface risk + limited risk-sharing instruments significantly reduces PGEO's overall investment attractiveness. In summary, PGEO's strategic issues are centered on:

- Geothermal projects that are not yet sufficiently bankable under current tariff and incentive structures.
- Insufficient de-risking and financing support for early-stage exploration.
- The perception that risk–return profiles in geothermal are less appealing than alternative renewable investments

A2. When and under what circumstances did you begin to observe challenges or declining interest from investors?

Challenges typically become apparent from the very beginning of the project lifecycle, starting in the exploration phase, where the combination of high uncertainty and high capital requirements is most pronounced. At this stage, investors begin to realize that exploration drilling demands very large upfront expenditures with no guarantee of a commercially viable resource. Subsurface risk is substantial: wells may turn out deeper, hotter, or geologically more complex than anticipated, which can push costs far beyond initial estimates. At the same time, monetization of the resource is still several years away, so cash flows are distant and heavily exposed to regulatory and tariff risk.

Under these circumstances, investor appetite tends to weaken. Some investors withdraw before financial close, while others demand more conservative project structures, higher returns, or additional guarantees. Declining interest is often triggered when feasibility studies and early drilling results reveal that projected CAPEX is rising, the project's levelized cost of electricity (LCOE) risks exceeding the approved tariff, and there is no clear mechanism for tariff adjustment or exploration risk-sharing. Thus, the challenge does not suddenly emerge at the end of the project; it surfaces as soon as investors fully understand the risk and cost profile of the exploration phase.

A3. What are the most tangible impacts of these issues on the company's project continuity and investment targets?

The most visible and tangible impact is that projects are postponed, downsized, or terminated. When exploration results are inconclusive or the economics become unattractive, projects can be shelved indefinitely, leaving partially explored fields and stranded preparatory investments, and some working areas never progress to full development or commercial operation, so no additional installed capacity is realized.

For PGEO and its partners, this manifests as capital write-offs from sunk exploration costs that cannot be recovered, a shrinking pipeline of projects that can be brought to financial close, and delays in meeting internal growth targets for installed capacity and revenue. At a broader level, these project-level setbacks accumulate into missed corporate and sectoral investment targets. Planned additions to geothermal generation capacity are not delivered on schedule, affecting PGEO's medium- to long-term business plan, its attractiveness in the eyes of current and potential investors, and the credibility of previously communicated investment roadmaps. In simple terms, projects stall, money is lost, and capacity targets are not achieved.

A4. Who are the most affected stakeholders—both internal and external—regarding these challenges?

The impacts of low investment attractiveness are felt across multiple stakeholder

groups. For government and policy makers, the state fails to achieve its planned additional installed geothermal capacity, directly undermining targets in the national energy plan (such as RUEN) and broader net zero emission (NZE) commitments. This creates a gap between policy ambitions and actual project delivery and may force the government to rely more heavily on other, potentially higher-emission or more expensive energy sources.

For developers and investors (including PGEO), project developers and equity investors face loss of capital when projects are abandoned after significant exploration spending, and they forgo future revenue streams that would have been generated over 20–30 years of plant operation. Repeated project cancellations or delays damage corporate credibility and can make it more difficult to attract financing for future ventures.

For lenders and financial institutions, banks and other lenders become more cautious about geothermal exposure, demand higher risk premiums, or avoid the sector altogether, which further reduces available financing and raises the cost of capital.

Local communities and the wider public also feel the impact. Communities around project sites lose opportunities for local economic development, such as jobs, infrastructure improvements, and community development programs that usually accompany successful projects, while the public at large loses access to potential clean, reliable, and environmentally friendly energy that could improve energy security and reduce pollution.

For environment and climate stakeholders, every delayed or cancelled geothermal project represents a missed opportunity to displace fossil-fuel generation, slowing emissions reductions and climate progress. Thus, while the immediate financial loss is borne by developers and investors, the broader consequences are systemic: government targets are missed, financial institutions become more risk-averse, communities lose development opportunities, and the country's transition to clean energy is slowed.

B5. In your view, what are the primary causes of PGEO's current low investment attractiveness?

One of the central causes is the lack of clarity and certainty in Power Purchase Agreement (PPA) negotiations with PLN. Because geothermal projects depend entirely on long-term offtake contracts to secure financing, any delay, ambiguity, or prolonged negotiation process directly undermines project bankability. As long as there is no confirmed tariff structure or clear PPA framework, investors view geothermal projects as excessively risky.

The absence of a transparent mechanism for determining tariffs—particularly given geothermal's inherently higher cost structure—makes it difficult for investors to assess potential returns or commit capital. Consequently, uncertainty in the PPA becomes a major bottleneck that blocks progress from exploration to development. In short, the primary cause of low investment attractiveness is the extended and uncertain negotiation process with PLN, which prevents PGEO from demonstrating predictable revenue streams needed for investment decisions and financial close.

B6. Why do you think this is the case?

This situation largely stems from the market structure in which PLN acts simultaneously as a monopolist (sole electricity distributor) and a monopsonist (sole electricity buyer). With full market power and a broad portfolio of generating assets, PLN is able to prioritize lower-cost sources of electricity such as coal and gas. Meanwhile, geothermal still carries a perception of being more expensive because of its higher upfront capital requirement, long development period, and exploration risks.

As a result, PLN does not yet view geothermal as an urgent or strategic priority, geothermal developers are still expected to compete directly with other energy sources purely on tariff without special treatment, and there is no differentiated policy that recognizes geothermal's baseload value or its importance for long-term energy security and decarbonization. Because PLN controls the negotiation leverage and the current

regulatory environment still places geothermal under the same ceiling-price regime as other energy sources, geothermal is not positioned as a priority sector.

This dynamic leads to prolonged tariff negotiations, conservative PPA terms, and limited willingness from PLN to absorb geothermal risks, all of which reduce investor enthusiasm. In essence, the root cause is the combination of PLN's market dominance, its current oversupply condition, and the absence of a policy mechanism that elevates geothermal to a status of national urgency.

B7. Considering aspects such as human resources, organizational structure, communication, regulations, or operational processes, which internal factors contribute most significantly to this condition?

From an internal perspective, one of the most significant contributing factors is communication and negotiation capability. Given that PLN holds the stronger bargaining position, PGEO's ability to present compelling arguments, influence decision-making, and negotiate effectively becomes critical. This includes the ability to articulate geothermal's long-term value beyond short-term tariff comparisons, skill in navigating PLN's internal decision processes, consistency and clarity in communicating project economics, risk profiles, and development timelines, and strategic alignment between technical, commercial, and regulatory teams so that PGEO presents a unified negotiation stance.

Any gap in communication or negotiation strategy can result in weaker bargaining power, slower progress, or acceptance of less favorable terms. Therefore, internal capabilities—particularly in strategic communication, regulatory understanding, and high-stakes negotiation—play a key role in shaping overall investment attractiveness.

B8. Have any interventions been implemented previously? If so, why do you think the outcomes were suboptimal?

Yes, several interventions have been attempted, including multiple negotiation rounds,

refinements to tariff proposals, and efforts to strengthen the economic justification for geothermal development. However, the outcomes have often been suboptimal because of the structural imbalance built into the current market setting.

Since PLN is the single offtaker, the negotiation dynamic is inherently asymmetrical: PGEO and other developers effectively act as price takers, while PLN, as the price maker, has much greater influence over tariff outcomes. Existing regulations define tariffs as ceiling prices rather than fixed or guaranteed levels, and any tariff below the ceiling still requires negotiation and PLN's approval, which prolongs the process.

These conditions create a situation where—even with interventions, better preparation, or improved proposals—the results remain constrained by PLN's limited incentive to prioritize geothermal, PLN's internal preference for cheaper generation sources, a regulatory framework that does not mandate geothermal-specific off-take requirements, and the absence of risk-sharing mechanisms that would make geothermal more attractive to PLN. Thus, although interventions have been made, their effectiveness is limited by structural factors beyond PGEO's direct control, making it difficult to achieve significantly improved outcomes.

C9. How do you perceive the influence of government regulations and policy frameworks on PGEO's current investment climate?

Government regulation plays a decisive role in shaping the investment climate for geothermal development. Although the government has expressed strong ambitions for renewable energy, current policies do not yet fully optimize or accelerate geothermal utilization. Much of the regulatory framework still emphasizes fiscal revenue generation, for example through licensing fees, taxation structures, and working area allocations, rather than creating a comprehensive set of incentives and streamlined processes that would stimulate faster geothermal deployment.

In practice, the policy environment lacks clear direction on how geothermal should be

prioritized, how risks should be shared, and how the government can build a more attractive investment ecosystem through coordinated incentives. Without a structured strategic roadmap that treats geothermal as a national priority beyond revenue considerations, investors perceive regulatory uncertainty and insufficient alignment between policy goals and implementation mechanisms. Consequently, government regulation exerts a strong influence but has not yet become fully supportive in terms of accelerating geothermal development or enhancing PGEO's investment attractiveness.

C10. In your opinion, are there significant macroeconomic factors (e.g., energy price volatility, interest rates) that affect investor decisions?

Yes, macroeconomic factors significantly affect investor decisions. Interest rates directly influence the cost of project financing. Because geothermal projects rely heavily on long-term debt, even small increases in global or domestic interest rates can sharply raise the levelized cost of electricity (LCOE), making geothermal less competitive compared to other energy sources with lower upfront capital requirements.

Foreign exchange (FX) fluctuations are also critical because many geothermal components, including drilling materials, equipment, and specialized services, are imported. Depreciation of the local currency increases CAPEX, often beyond original budgets. This is compounded by the fact that many PPAs include escalation clauses tied to indicators such as the consumer price index (CPI), producer price index (PPI), or exchange rate movements, making macroeconomic stability a key determinant of projected returns. In summary, trends in interest rates and currency volatility have a substantial impact on project economics and investor confidence.

C11. Have there been shifts in public perception or societal preferences regarding geothermal energy that PGEO needs to consider?

Yes, public sentiment toward geothermal development has become more complex. In some regions, geothermal projects encounter community resistance, often driven by concerns about land use, environmental impacts, cultural heritage, or perceived risks

associated with drilling activities. These social challenges can delay projects, raise costs, and create reputational risks that investors must take into account.

At the same time, since PGEO became a publicly listed company, public perception is increasingly shaped by its stock market performance. The broader public, including potential investors, now assesses PGEO not only as an energy company but also through the lens of market valuation, share price movements, and quarterly results. This evolution places greater pressure on PGEO to maintain consistent operational performance and transparent communication in order to sustain investor trust. Thus, societal preferences now encompass both local community acceptance and public market expectations, and both dimensions influence investor sentiment.

C12. Is PGEO facing any challenges related to the adoption of technology or the digitalization of information relevant to investors?

Yes, PGEO faces technological and digitalization challenges, as is common in capital-intensive and infrastructure-based industries, although the company has generally been able to adapt effectively. Key challenges include modernizing data platforms, adopting real-time monitoring technologies, improving data transparency for investors, and ensuring that digital systems are integrated across exploration, drilling, operations, and ESG reporting.

Despite these challenges, PGEO has demonstrated strong adaptability and continues to improve its technological and digital capabilities. Nonetheless, investor expectations regarding transparency—particularly for ESG metrics, resource assessments, and operational performance—are rising, and PGEO must continuously upgrade its digital reporting ecosystem to remain competitive.

C13. How do environmental conditions and ESG-related pressures affect the company's competitiveness?

Environmental and ESG pressures exert growing influence on competitiveness, and

PGEO is currently in a favorable position. The company has been recognized as the top geothermal utility in the world in terms of ESG performance, which enhances its credibility, strengthens investor confidence, and positions it as a responsible leader in sustainable energy.

However, geothermal development still involves environmental considerations such as land disturbance, emissions of non-condensable gases, and proximity to protected natural areas. Therefore, while PGEO's strong ESG profile provides a competitive advantage, ongoing adherence to strict environmental standards and continuous improvement in ESG practices remain essential to maintain investor trust and to further differentiate PGEO from other renewable energy developers.

C14. Are there any legal or licensing barriers that, in your opinion, hinder investor interest?

Yes, legal and licensing barriers are among the most persistent challenges. Many geothermal resources in Indonesia are located within or adjacent to protected conservation areas, such as nature reserves, national parks, or forest zones governed by forestry laws. These areas are subject to strict regulations that limit land access, restrict drilling operations, or require lengthy and complex approval processes.

Furthermore, several geothermal prospects overlap with cultural heritage sites protected under cultural preservation laws, imposing additional restrictions and requiring careful coordination with local and national authorities. These overlapping legal frameworks often result in prolonged permitting processes, high regulatory uncertainty, increased permitting risk for investors, and potential project delays or cancellations. Consequently, the complexity of licensing and land-use regulation significantly raises the perceived risk of geothermal investments and can discourage potential investors from entering the sector.

D15. What competitive advantages (strengths) does PGEO currently possess in the eyes of investors?

PGEO possesses several strategic strengths that make it attractive to investors. First, it holds the largest and most extensive geothermal Working Area (WKP) portfolio in Indonesia, providing access to some of the country's most promising high-enthalpy resources. This scale gives PGEO a long project pipeline and substantial potential for future capacity expansion.

Second, PGEO benefits from strong institutional backing from Pertamina, its parent company. As part of a major state-owned enterprise group, PGEO enjoys enhanced credibility, access to broader corporate capabilities, and the reputational benefits of being embedded in the national energy ecosystem. This affiliation reassures investors about operational reliability, long-term stability, and corporate governance standards.

Third, PGEO has more than 40 years of experience in geothermal exploration, drilling, and operation. This long operational history, which is rare in the geothermal sector, provides deep technical expertise, established procedures, and proven capabilities in managing subsurface risk. This legacy of experience reduces execution risk and strengthens investor confidence. Combined, these strengths—extensive resource control, strong institutional support, and decades of technical mastery—form a compelling competitive advantage for PGEO in the renewable energy market.

D16. What internal weaknesses is the company currently working to address?

A key internal challenge that PGEO continues to address is achieving strong commercial viability across its project portfolio. Despite holding promising resources, geothermal development remains capital-intensive with long payback periods, and ensuring that each project meets bankability thresholds is an ongoing task.

Another internal weakness lies in the approach to securing favorable PPAs. Negotiating tariffs that accurately reflect the true cost of geothermal development has proven difficult within the current regulatory and market structure. PGEO is continuously refining its commercial strategies, negotiation frameworks, and internal coordination in order to improve its ability to secure PPAs that align with investor expectations and financial

model requirements. In summary, PGEO is actively working to strengthen project commerciality and improve its PPA negotiation position, both of which are crucial for unlocking investment and sustaining long-term growth.

D17. In your view, what external opportunities remain underutilized by PGEO?

Several high-potential opportunities remain underutilized, particularly those beyond the traditional electricity sales model. One promising area is the commercial direct use of geothermal resources, such as industrial heating, district heating, agricultural applications, and tourism, which can generate new revenue streams with lower regulatory dependence.

Another major opportunity involves geothermal mineral extraction, including lithium, silica, and other valuable minerals naturally present in geothermal brine. As global demand for battery materials and critical minerals increases, PGEO could leverage this opportunity to diversify its business portfolio.

In addition, geothermal by-products present strategic opportunities for green hydrogen and green ammonia production. By using geothermal electricity and heat to power electrolysis or synthesis processes, PGEO can produce high-value, low-carbon products that meet growing global demand.

A further opportunity is to pursue off-grid or captive-use models, where geothermal power is used directly to produce value-added products or supply industrial clusters rather than being sold to PLN. This approach reduces dependence on the single-buyer system and increases flexibility in monetizing energy. If developed strategically, these opportunities could significantly enhance PGEO's revenue diversification and long-term competitiveness.

D18. Do you perceive any external threats—from competitors, substitute technologies, or regulatory changes—that require attention?

The most significant external threat is regulatory instability. Policy frameworks governing geothermal development—including permitting, pricing, incentives, and land classification—remain incomplete and subject to frequent changes. This unpredictability generates uncertainty for long-term capital commitments and complicates financial planning for both developers and investors.

When regulations shift without clear transition mechanisms, project timelines are disrupted, negotiations must be revisited, and previously agreed assumptions may no longer hold. Such volatility can discourage investors and slow the development of the sector.

Beyond regulation, geothermal faces indirect competition from lower-cost renewable technologies such as solar and, increasingly, wind. Although these sources are intermittent, their rapidly declining costs influence government and utility priorities, making it more challenging for geothermal to secure attention, budget allocation, and policy support.

In summary, the main external threats include unstable and insufficient regulatory frameworks, frequent policy changes, and growing competition from cheaper renewable alternatives. Together, these factors pose strategic risks to PGEO's investment attractiveness and long-term development pipeline.

EA19. How does PGEO identify and monitor trends and opportunities related to green investment?

PGEO actively identifies and monitors green investment trends through a combination of global benchmarking and participation in international geothermal platforms. The company regularly studies best practices from leading geothermal countries and companies to understand emerging technologies, financing models, policy incentives, and market innovations.

PGEO also participates in major international conferences, forums, and industry associations—for example, the World Geothermal Congress and events organized by the International Geothermal Association (IGA)—which provide ongoing exposure to global investment flows, ESG expectations, and technological breakthroughs. Through these engagements, PGEO gains insight into international developments and is better able to anticipate future opportunities in areas such as direct use, critical mineral extraction, and green hydrogen. This outward-looking approach broadens PGEO’s strategic perspective and helps keep it aligned with global momentum toward clean energy investments.

EA20. Are there any systems or mechanisms in place to track investor preferences and regulatory developments?

Systems are in place, but they are still limited and not yet fully robust. PGEO has mechanisms to monitor regulatory updates and investor sentiment, but these tend to be reactive rather than proactive. Much of the monitoring relies on periodic reporting, external communication, and ad hoc coordination across departments, rather than an integrated system that continuously tracks policy dynamics, investor risk appetite, and evolving market standards.

As a consequence, PGEO can detect major regulatory shifts, but its ability to anticipate policy changes or proactively shape regulatory discussions is still developing. Strengthening early-warning systems—such as regulatory intelligence, investor analytics, and structured market scanning—would significantly enhance PGEO’s sensing capabilities.

EB21. What strategic initiatives has PGEO undertaken to improve its image and credibility among investors?

PGEO has implemented several strategic initiatives to strengthen its market credibility. One key step is the establishment of a dedicated Investor Relations (IR) function that manages communication with investors, analysts, and financial institutions. This

function helps ensure consistent messaging, transparency, and timely disclosure of operational and financial performance.

In addition, PGEO collaborates with media and communication partners to maintain positive public visibility, emphasizing achievements, project milestones, and ESG performance. The company also prioritizes social responsibility, using CSR initiatives to build trust among local communities and reinforce its commitment to sustainable development.

Importantly, PGEO's recognition as the number-one geothermal utility in the world for ESG performance serves as a powerful proof point that significantly strengthens investor perception and supports long-term credibility in the green investment landscape.

EB22. How does PGEO respond to ESG demands and investor expectations for transparency?

As a publicly listed company, PGEO is required to comply with strict standards of disclosure and transparency. This includes the regular publication of audited financial reports, sustainability reports, corporate governance disclosures, and compliance documents, all of which align with investor expectations for clarity and accountability.

Moreover, PGEO's top global ESG ranking reflects its strong commitment to meeting international sustainability benchmarks. The company tracks environmental performance, community impact, and governance practices, and integrates ESG considerations into project planning and corporate decision-making. These initiatives not only fulfill regulatory requirements but also signal to investors that PGEO is a responsible and forward-looking energy company.

EC23. Has PGEO undergone any structural transformations, business model shifts, or strategic alliances in recent years?

Yes. PGEO has undertaken significant structural transformation, most notably its tran-

sition into a publicly listed company. This shift required major organizational adjustments, including upgraded governance structures, enhanced compliance mechanisms, and strengthened internal processes to meet capital market standards.

PGEO has also restructured parts of its organization to align more effectively with strategic priorities, operational efficiency, and investor expectations. These changes demonstrate PGEO's intention to modernize its business model and enhance its adaptability in a rapidly evolving renewable energy sector.

EC24. In your opinion, how prepared is the organization to adapt swiftly to changes in the investment landscape?

PGEO continues to make deliberate efforts to enhance its adaptability and position itself as a leading global geothermal company. The organization consistently seeks to improve agility, raise operational excellence, and align with international best practices.

However, its adaptive capacity is constrained by its status as an affiliate of a state-owned enterprise and a subsidiary within the PNRE sub-holding, which imposes certain boundaries on the speed and flexibility of decision-making. These structural constraints can affect how quickly the company can pivot in response to market shifts, regulatory changes, or emerging business opportunities.

Despite these limitations, PGEO's commitment to continuous improvement, combined with its strong technical legacy and growing investor-facing capabilities, suggests that the company is progressively strengthening its readiness to navigate a dynamic investment landscape.

Interview with COO OP of PPI

A1. What are the key strategic issues currently faced by PGEO in relation to its investment attractiveness?

- Bankability/commerciality: investors want proof that geothermal projects deliver attractive risk-adjusted returns under current tariff/incentive and PPA conditions.
- Execution & timeline risk: long project cycles mean delays quickly reduce IRR and hurt credibility.
- Early-stage funding challenge: exploration drilling needs big upfront money while subsurface risk is still high; investors want stronger de-risking/risk-sharing.
- Operational/resource risk: steam supply variability and outages can impact output and cashflow.
- High dependence on external parties: PLN contracting/process, permitting, and policy alignment can slow projects.
- Concentration/single-buyer exposure: reliance on key assets and PLN increases perceived risk.

A2. When and under what circumstances did you begin to observe challenges or declining interest from investors?

- After IPO, when investors shift from “story” to demanding proof points (on-time COD, stable output, cashflow growth).
- Around key milestone windows (COD deadlines, major project approvals/tenders) when credibility is tested.
- When there are signals of schedule uncertainty, policy/tariff questions, or short-term operational volatility.

A3. What are the most tangible impacts of these issues on the company's project continuity and investment targets?

- Project re-phasing: prioritizing “ready” projects; pushing higher-risk/less-ready projects later.
- Harder/more expensive financing: higher hurdle rates and tighter terms; more reliance on concessional/structured funding.
- Higher risk to capacity growth targets if COD additions slow.
- Stronger trade-offs on CAPEX allocation: focusing spending on projects with the best bankability and lowest delivery risk.

A4. Who are the most affected stakeholders—both internal and external—regarding these challenges?

Internal: Board/management, Finance–Treasury–IR, Project/Drilling/EPC teams, Operations/reservoir teams.

External: Investors/analysts, lenders/DFIs, PLN/offtakers, regulators/permitting agencies, contractors/partners, local communities.

B5. In your view, what are the primary causes of PGEO's current low investment attractiveness?

- Bankability/commerciality is still questioned: investors aren't fully convinced tariffs/incentives + PPA terms give strong risk-adjusted returns for high-capex geothermal.
- Early-stage exploration is hard to finance: big upfront drilling cost + high subsurface risk, with limited risk-sharing/guarantees.
- Execution & timeline risk: long development cycles; delays/cost overruns

quickly reduce IRR and hurt credibility.

- Heavy external dependency: permits, PLN processes/offtake readiness, land/forest approvals, and community acceptance affect the critical path.
- Proof-point gap: investors want frequent, visible milestones (COD, stable output, cashflow growth); without them they keep a discount.
- Competition from faster/cheaper renewables: solar/wind (+storage) often look easier to fund and deliver.

B6. Why do you think this is the case?

1. Why low attractiveness? Investors see high risk and uncertain returns.
2. Why uncertain returns? Revenue and project timelines feel unpredictable.
3. Why unpredictable? High upfront capex + subsurface risk + long approvals/PLN steps.
4. Why isn't risk reduced earlier? Limited de-risking tools and many dependencies outside PGEO control.
5. Why still discounted? Project governance/controls + portfolio focus + investor transparency are not yet consistently strong enough to offset geothermal risk.

B7. Considering aspects such as human resources, organizational structure, communication, regulations, or operational processes, which internal factors contribute most significantly to this condition?

- People: limited specialist depth; key-person dependency; gaps in project controls/contract management.
- Organization/Governance: slow decisions; unclear accountability per project milestone; complex cross-function coordination.
- Communication: not enough project-by-project milestone dashboards; inconsistent explanation of risks/dependencies/mitigation.

- Process/Operations: weak stage-gates; procurement lead times; change control/risk registers not consistently used; too many parallel priorities.
- Regulatory/Stakeholder interface: uneven permitting capability; inconsistent community engagement strength; PLN interface ownership not always clear.
- Finance/Capital allocation: CAPEX ramps before de-risking is complete; funding plan by project stage unclear; limited structured risk-sharing integrated early.

B8. Have any interventions been implemented previously? If so, why do you think the outcomes were suboptimal?

Yes, several efforts have been made—multiple negotiation rounds, revised tariff proposals, and stronger economic justifications for geothermal.

The outcomes were suboptimal

The results are often limited by a structural imbalance in the market.

Because PLN is the single offtaker, negotiations are unequal:

- Developers like PGEO are effectively price takers
- PLN has stronger power to shape the tariff
- Regulations set only a tariff ceiling, not a guaranteed price
- Any tariff below the ceiling still needs negotiation and PLN approval, which slows the process

So even with better preparation, outcomes are constrained by factors outside PGEO's control :

- PLN's limited incentive to prioritize geothermal
- Preference for cheaper power sources

- No regulation requiring geothermal-specific offtake
- Lack of risk-sharing mechanisms to make geothermal more attractive

C9. How do you perceive the influence of government regulations and policy frameworks on PGEO's current investment climate?

- Government rules on tariffs, incentives, procurement, and PPA terms largely determine whether geothermal projects are bankable.
- Investors are cautious when policy outcomes feel unclear or slow to implement (PPA negotiation time, tariff certainty, permitting delays).
- Policies that help most: standardized PPAs, government guarantees/risk-sharing, and faster, consistent permitting.

C10. In your opinion, are there significant macroeconomic factors (e.g., energy price volatility, interest rates) that affect investor decisions?

Yes,

- Interest rates / cost of capital: higher rates reduce project value and make geothermal (long-tenor, high capex) less attractive.
- FX (USD/IDR) volatility: imported equipment and any FX-linked debt become riskier when rupiah weakens.
- Energy price dynamics: if coal/gas looks cheap, investors assume renewables procurement may slow; if fossil costs rise, geothermal looks more attractive.

C11. Have there been shifts in public perception or societal preferences regarding geothermal energy that PGEO needs to consider?

Yes,

Public sentiment on geothermal is more mixed now. Some projects still face local resistance due to land use, environmental concerns, cultural issues, or drilling risks—these can cause delays, higher costs, and reputational risk.

At the same time, since PGEO became a listed company, public perception is also shaped by its stock performance. People judge PGEO not only as an energy company, but also by valuation, share price, and quarterly results—raising pressure to deliver steady performance and communicate transparently.

So today, investor sentiment is influenced by both community acceptance and broader market expectations.

C12. Is PGEO facing any challenges related to the adoption of technology or the digitalization of information relevant to investors?

Yes,

PGEO faces tech and digitalization challenges like many capital-intensive, infrastructure-based companies. Key needs include upgrading data platforms, expanding real-time monitoring, improving investor transparency, and integrating digital systems across exploration, drilling, operations, and ESG reporting. PGEO has adapted well and continues to improve, but rising investor expectations—especially around ESG, resources, and performance—mean PGEO must keep strengthening its digital reporting.

C13. How do environmental conditions and ESG-related pressures affect the company's competitiveness?

- ESG is a tailwind (low-carbon baseload) but also a risk (site impacts, community conflict, HSE issues).

- Strong ESG performance can lower cost of capital and attract green investors; weak ESG can cause delays and raise risk premiums.

C14. Are there any legal or licensing barriers that, in your opinion, hinder investor interest?

Yes,

- Biggest issue is complex and time-consuming licensing/permitting (land/forest permits, AMDAL, multi-agency approvals).
- Even if reforms exist, investors wait for consistent, faster execution across projects and regions.

D15. What competitive advantages (strengths) does PGEO currently possess in the eyes of investors?

- Market leader scale + resource access: large operating footprint and working areas give long runway and “category leader” credibility.
- Baseload renewable value: geothermal is dispatchable/stable vs intermittent renewables, supporting the “strategic importance” story.
- Revenue visibility: long-term offtake contracts give predictable cashflow profile (infrastructure-style).
- Clear growth roadmap: PGEO has a multi-year expansion plan with named projects/milestones.
- Strong backing + partner credibility: Pertamina group support and strategic partners improve confidence and access to capital.
- Green finance readiness: ESG/green financing framework helps access a wider pool of “green/transition” funding.

D16. What internal weaknesses is the company currently working to address?

- Single-buyer / concentration exposure: heavy reliance on PLN and key assets increases perceived risk.
- High capex + long timeline execution risk: delays/cost overruns quickly reduce returns and hurt credibility.
- Exploration risk still high: early-stage drilling is expensive and uncertain; limited de-risking lowers investor appetite.
- JOC complexity: less direct control/economics for some assets complicates delivery and forecasting.
- Commerciality still policy/tariff sensitive: investors worry PPA/tariff implementation may not fully compensate geothermal risk.

D17. In your view, what external opportunities remain underutilized by PGEO?

- Big renewables build-out (incl. geothermal): Indonesia's power plan implies major capacity additions—large market space for PGEO.
- More private/IPP participation: room for JVs and project-level financing instead of relying mainly on balance sheet.
- Stronger PPA standardization / guarantees: policy improvements can be used to speed bankable contracting.
- Lower cost of capital via green finance: expand green loans/bonds/sukuk using existing frameworks.
- Use strategic partners more deeply: co-investment, global lenders, and credibility to accelerate projects.
- Commercial direct-use of geothermal resources, such as industrial heating, agriculture applications, and tourism. These
- Geothermal mineral extraction, including lithium, silica, and other valuable minerals naturally present in geothermal brine. As global demand for battery

materials and critical minerals rises, PGEO could leverage this opportunity to diversify its business portfolio.

- Geothermal by-products offer strategic potential, particularly green hydrogen and green ammonia production. By using geothermal electricity and heat to power electrolysis or synthesis processes, PGEO can create high-value, low-carbon products that meet growing global demand.
- Off-grid or captive-use models, where geothermal power is not sold to PLN but instead used directly to produce value-added products or to supply industrial clusters.

D18. Do you perceive any external threats—from competitors, substitute technologies, or regulatory changes—that require attention?

- Stronger competitors: other geothermal players competing for capital, talent, rigs, and EPC capacity.
- Solar + battery energy storage scaling fast: faster/cheaper substitutes may attract investors unless geothermal's baseload value is priced properly.
- Social license risk: community opposition can delay projects and increase reputational risk.
- Regulatory changes/uncertainty: shifts in procurement or tariff interpretation can tighten returns or slow contracting.
- Macro risks: higher rates or FX volatility raise WACC and weaken geothermal risk-return.

EA19. How does PGEO identify and monitor trends and opportunities related to green investment?

- Tracks green finance standards (what qualifies as “green” and what reporting investors require) through its Green Financing Framework and governance around it.

- Benchmarks itself vs ESG investors’ expectations using external ESG assessments/recognition and market feedback.
- Monitors new “green value pools” like carbon-credit potential and other transition-related revenue ideas.
- Uses internal digitalization (data and performance monitoring) to spot operational risks/opportunities earlier.

EA20. Are there any systems or mechanisms in place to track investor preferences and regulatory developments?

- Internal governance for green finance (committee/processes for selecting eligible projects, tracking proceeds, and reporting impact).
- Regular disclosure cycle (annual report, sustainability reporting, investor updates) that creates ongoing investor feedback loops.
- Regulatory watch function (typically Legal/Regulatory + Strategy + IR) to monitor OJK/MEMR/PLN updates and translate them into project structuring and messaging.

1. EB21. What strategic initiatives has PGEO undertaken to improve its image and credibility among investors?

- Strengthened credibility through “investable” frameworks (green finance framework, independent review/assurance, clear governance).
- Built strategic credibility through partnerships (strategic investor/partner validation).
- Improved transparency via more structured public reporting and operational updates.
- Invested in operational improvements (digital/process improvements) to reduce execution risk.

2. EB22 How does PGEO respond to ESG demands and investor expectations for transparency?

- Publishes sustainability disclosures and maintains recurring reporting cadence.

- Commits to use-of-proceeds + impact reporting for green financing (what green investors specifically want).
 - Uses governance controls to ensure ESG commitments are tracked and auditable (data discipline, monitoring, oversight).
3. EC23. Has PGEO undergone any structural transformations, business model shifts, or strategic alliances in recent years?
 4. Yes,
 - Shift to a public-company operating model (higher disclosure discipline, broader investor base).
 - Green finance governance embedded (committee + reporting structure).
 - Digital transformation initiatives to improve data-driven operations and execution.
 - Strategic alliances/partners to strengthen funding access, credibility, and capability.
 5. EC24. In your opinion, how prepared is the organization to adapt swiftly to changes in the investment landscape?
 6. PGEO is actively working to improve its agility and strengthen its position as a global geothermal leader by boosting operational excellence and aligning with international best practices.
 7. However, as part of a state-owned enterprise structure, PGEO faces limits on how fast and flexibly it can make decisions, which can slow responses to market, regulatory, or business changes.
 8. Even so, PGEO's strong commitment to improvement, solid technical foundation, and growing investor-focused capabilities show it is becoming readier to compete in a changing investment landscape.