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Analysis of the Role of Green Accounting and Sustainability Image at PT Pertamina Geothermal Energy, Lahendong Area

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Abstract

This study examines how green accounting supports sustainability-related corporate communication at PT Pertamina Geothermal Energy Tbk, Lahendong Area. A qualitative interpretive case study was conducted in May–June 2026 using observations, structured interviews with Business Support and Public Relations representatives, and company documentation. Data were interpreted through reduction, display, and conclusion drawing, with attention to environmental activities, expenditure classifications, waste management, and sustainability communication, including distinctions between activities and stakeholder perceptions. Findings indicate that environmental activities are managed at the operating-area level while financial administration and reporting are centralized at corporate headquarters. Environmental expenditures are identified through General Ledger accounts, cost centers, and budget allocations. Seven of ten reported green accounting indicators were implemented, corresponding to descriptive coverage of 70%, while separate area-level environmental reporting remained absent. Hazardous-waste budgets fluctuated over 2021–2025, but available data do not establish expenditure efficiency or treatment performance. Waste-management practices included hazardous-waste handling, brine reinjection, material recovery, and periodic monitoring. Community engagement and environmental programs provided evidence underlying sustainability communication, including the SetorJo Waste Bank initiative. The study concludes that green accounting supports environmental accountability through integrated reporting arrangements; however, its effect on public perceptions of sustainability image remains unverified because independent stakeholder assessments were unavailable.

Keywords: *Corporate Accountability, Environmental Accounting, Green Accounting, Sustainability Image, Waste Management.*

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INTRODUCTION

The expansion of low-carbon energy production has intensified scrutiny of whether environmental responsibilities are incorporated into corporate financial accountability rather than managed solely as technical compliance obligations. Research on green economy implementation positions environmental protection and economic development as interdependent policy and business objectives, particularly where natural resources are integral to production systems (Ali et al., 2021). Geothermal electricity provides an alternative to fossil-based generation, but its exploration, steam processing, and facility maintenance may still create wastewater, sludge, and gaseous emissions requiring systematic control. PT Pertamina Geothermal Energy has documented its broader environmental and community commitments, illustrating the organizational relevance of sustainability considerations within its geothermal operations (Pertamina Geothermal Energy, 2019). The Lahendong Area represents a pertinent organizational setting because site-level environmental activities occur within a corporate structure that also determines how related costs and responsibilities are reported. Existing investigation of environmental accounting in the Lahendong Area establishes a direct empirical point of reference for evaluating how such activities enter corporate accounting arrangements (Mapasa et al., 2023). Literature linking green accounting to pollution prevention and business continuity further supports the need to examine environmental accountability as a managerial process rather than a symbolic commitment (Ariani & Zulhawati, 2023).

Contemporary scholarship on green accounting can be organized into three overlapping strands comprising environmental cost management, organizational outcomes, and sustainability disclosure.

Studies of waste management examine how environmentally related activities are identified and represented through accounting procedures, emphasizing the practical connection between operations and financial documentation (Jauhari et al., 2024). Research on manufacturing firms broadens this discussion by associating green accounting with company performance, although those findings concern organizational outcomes rather than the formation of a sustainability image (Achmar & Susanti, 2025). Evidence from listed oil and gas companies likewise considers environmental accounting alongside business health, extending the discussion into energy-related industries with distinct operational risks (Olaoye & Alao, 2023). A separate body of work addresses the role of green accounting in the quality of sustainability reporting, shifting attention from cost recognition toward the credibility and communication of environmental information (Maharani & Akbar, 2025). These strands indicate that accounting practices, business performance, and external disclosure are analytically connected, yet their interrelationship cannot be assumed to establish how a particular geothermal facility acquires or sustains an environmentally responsible corporate image.

The central research gap concerns the limited integration of operational accounting evidence and sustainability-image analysis within a single site-specific examination of geothermal energy production. Research undertaken in the Lahendong Area provides a foundation for understanding the application of environmental accounting, but an assessment of accounting implementation alone does not demonstrate how sustainability-related representations are supported by underlying practices (Mapasa et al., 2023). Work connecting green accounting with pollution prevention and business continuity addresses environmental and organizational functions without making stakeholder-facing corporate image an equivalent measure of implementation (Ariani & Zulhawati, 2023). Studies involving sustainability reports, green accounting, managerial ownership, and firm value demonstrate another line of inquiry, but firm valuation is conceptually distinct from the credibility of a company's sustainability image (Ramadhanti & Machdar, 2025). Indonesian literature on green accounting and environmental sustainability expands the theoretical relevance of these issues, while leaving room for a closer examination of their interaction under specific corporate reporting arrangements (Fratmanisa & Sisdianto, 2025). In the Lahendong Area, the integration of financial administration into head-office systems makes it necessary to distinguish site-level environmental activities from the organizational level at which related expenditures are formally recognized and disclosed. The unresolved issue is not merely whether environmental costs are incurred, but whether their recognition and presentation can be meaningfully related to the sustainability claims associated with the operating area.

This research gap has practical implications because environmental management can be operationally visible while its financial representation remains difficult to trace across different organizational reporting levels. The examination of green accounting in waste management indicates that accounting information can be used to evaluate environmental expenditure and the management of waste-related responsibilities (Jauhari et al., 2024). Without a clear connection between these activities and the applicable reporting structure, management may have a limited basis for assessing whether environmental resources are allocated, documented, and communicated consistently. Pertamina Geothermal Energy's integrated reporting materials place geothermal operations alongside environmental and social commitments, making the coherence of reported responsibilities an appropriate subject for examination (Pertamina Geothermal Energy, 2019). The literature on green accounting and sustainability-report quality also makes reporting substance relevant to the evaluation of corporate sustainability communication (Maharani & Akbar, 2025). An evidence-based assessment of this relationship can assist corporate decision-making and stakeholder evaluation without equating the presence of environmental programs with demonstrably positive public perceptions.

The present study is positioned at the intersection of environmental accounting implementation, corporate reporting arrangements, and the construction of a sustainability-related organizational image. Its site-specific foundation is provided by prior work on environmental accounting at PT Pertamina Geothermal Energy's Lahendong Area, which makes a focused extension more defensible than an assumption of an entirely unexplored research setting (Mapasa et al., 2023). Broader research connecting green accounting to corporate performance offers a useful comparison, but performance outcomes cannot substitute for analysis of how environmental commitments are evidenced and communicated (Achmar & Susanti, 2025). Research on sustainability reporting, accounting, and firm value further clarifies why the informational and reputational dimensions of corporate sustainability should be examined without treating them as identical constructs (Ramadhanti & Machdar, 2025). The

proposed novelty lies in evaluating the correspondence among documented environmental activities, recognition of their costs within centralized accounting arrangements, and sustainability representations associated with the operating area. Sustainability image is treated as the organizational image projected through environmental conduct and communication, not as a directly measured level of stakeholder trust unless independent perception data are available. This analytical distinction permits an appraisal of consistency between operational evidence and sustainability-related claims while avoiding unsupported assumptions about reputation, financial gains, or causal effects.

This study aims to analyze the role of green accounting in supporting the sustainability image of PT Pertamina Geothermal Energy in the Lahendong Area through an examination of its environmental management and reporting arrangements. The first objective is to identify how waste-management activities and related environmental responsibilities are reflected in the application of environmental accounting. The second objective is to examine the implications of centralized financial administration for the identification, recording, and presentation of environmental costs originating from the operating area. The third objective is to assess the consistency between documented environmental practices, available accounting information, and sustainability-related organizational communication. The study is expected to contribute conceptually by distinguishing environmental accounting implementation from claims about sustainability image and by clarifying the evidence necessary to relate these two dimensions. Its practical contribution is to provide an analytical basis for evaluating environmental accountability and communication in geothermal operations without attributing stakeholder perceptions or organizational outcomes that have not been independently established.

RESEARCH METHODS

This study adopted a qualitative research approach within an interpretive case study design to examine the role of green accounting in supporting the sustainability image of PT Pertamina Geothermal Energy, Lahendong Area, emphasizing the interpretation of environmental management practices and organizational accountability in their natural setting (Sugiyono, 2022). The research was located at PT Pertamina Geothermal Energy, Lahendong Area, with the fieldwork period specified as May to June 2026 and the operating area established as the principal unit of analysis. Primary data collection was designed to combine direct observation, structured interviews with representatives of the Business Support and Public Relations divisions, and field documentation to obtain information concerning organizational practices and environmental management responsibilities (Hardani et al., 2020). Observations focused on waste-management procedures and the transportation of waste to designated treatment facilities, while interviews addressed environmental accounting implementation, waste-management policies, pollution prevention, and relationships with surrounding communities. Secondary data sources included company profiles, waste-management records, relevant scientific literature, and corporate documentation concerning environmental and social responsibilities, including the company's published integrated sustainability materials (Pertamina Geothermal Energy, 2019). The selection of the Lahendong Area as the research setting also provided continuity with previous site-specific investigations of environmental accounting, enabling the examination of accounting practices alongside their potential implications for sustainability-related organizational representations (Mapasa et al., 2023).

The qualitative data analysis was structured around three interconnected procedures consisting of data reduction, data display, and conclusion drawing, following the analytical framework developed by Miles et al. (2014). Data obtained through interviews, observations, photographs, and organizational documentation were organized according to environmental cost identification, waste-management implementation, accounting responsibilities, and sustainability-related corporate communication. The interpretation of environmental accounting practices considered the distinction between operational activities conducted at the Lahendong Area and financial reporting administered through the company's centralized accounting system, consistent with the organizational issues examined in previous research at the same location (Mapasa et al., 2023). The sustainability-image dimension was examined through the correspondence between documented environmental management activities and sustainability-related corporate communication, without assuming that corporate disclosures independently establish positive stakeholder perceptions (Maharani & Akbar, 2025). Information obtained from interviews, field observations, and documentary sources was compared to identify consistency and discrepancies

among available evidence, supporting the credibility of qualitative interpretation through cross-source examination (Hardani et al., 2020). The analytical conclusions were limited to evidence concerning environmental accounting implementation, waste-management responsibilities, reporting arrangements, and sustainability communication, without introducing unsupported quantitative measurements, additional informants, or unobserved organizational outcomes.

RESULTS AND DISCUSSION

Implementation of Green Accounting and Environmental Cost Accountability

The findings indicate that green accounting at PT Pertamina Geothermal Energy Tbk, Lahendong Area, is implemented through an integrated corporate accounting structure rather than an independently administered environmental accounting system at the operational level. Environmental activities are identified and conducted by the operating area, while the associated financial information is processed through accounting procedures administered by the company's head office. This organizational arrangement demonstrates that environmental accounting implementation does not necessarily require each operating unit to produce separate financial statements concerning its environmental responsibilities. Previous research conducted at the Lahendong Area provides an empirical foundation for understanding the relationship between environmental management activities and the company's accounting practices (Mapasa et al., 2023). Green accounting serves as an information mechanism through which environmental responsibilities can be connected to financial identification, expenditure classification, and organizational accountability. The incorporation of environmental considerations into accounting practices reflects an expanded understanding of corporate responsibility that integrates economic activities with environmental protection requirements (Almunawwaroh et al., 2022). The effectiveness of this arrangement depends on the extent to which environmental expenditures can be identified, classified, and monitored consistently within the centralized accounting system.

The division of responsibilities between the operational area and corporate headquarters represents a defining characteristic of environmental accounting implementation at the Lahendong Area. Operational management is responsible for conducting environmental monitoring, controlling pollution, managing waste, and implementing programs associated with environmental protection and community development. Financial administration remains integrated into corporate procedures, creating a distinction between the location where environmental activities occur and the organizational level where related expenditures are formally recorded. This arrangement is consistent with the managerial orientation of green accounting, which recognizes the importance of integrating environmental information into broader organizational accounting and control mechanisms (Ompusunggu et al., 2024). Centralized reporting may support consistency in accounting classifications and corporate oversight, although it can also restrict the availability of separately presented financial information for individual operating areas. The absence of independent environmental financial statements at Lahendong should consequently be distinguished from the absence of environmental accounting activities, because environmental expenditures may still be recorded through the company's centralized financial system.

Environmental cost identification constitutes an essential component of the accounting practices associated with geothermal operations at the Lahendong Area. The research material identifies expenditure categories associated with water quality monitoring, air quality monitoring, hazardous and toxic waste management, environmental services, and community empowerment activities. These activities require financial resources that must be allocated and recorded according to their operational purposes, particularly when environmental obligations involve recurring monitoring and specialized waste treatment procedures. Research on green accounting in waste management emphasizes the importance of connecting environmental activities with accounting information to support the identification and management of environmental expenditures (Jauhari et al., 2024). Environmental cost identification provides a foundation for distinguishing resources allocated to pollution prevention, environmental control, waste management, and other activities supporting operational sustainability. The relationship between environmental accounting and pollution prevention also indicates that environmental expenditure information can contribute to organizational efforts to maintain responsible business operations (Ariani & Zulhawati, 2023). The available evidence establishes the existence of identifiable environmental expenditure categories, although complete transaction-level documentation

would be required to determine whether every relevant environmental cost has been recognized and classified consistently.

The utilization of General Ledger (GL) accounts and cost centers provides an administrative mechanism for incorporating environmental expenditures into the company's financial management system. The research material identifies accounts associated with work and environmental services that accommodate activities such as environmental monitoring, hazardous waste management, pest control, and other environmental initiatives. The application of these accounting classifications allows environmental expenditures to be associated with particular operational activities and organizational responsibilities rather than being treated exclusively as general administrative costs. Environmental accounting theory recognizes cost identification and classification as important components of integrating ecological considerations into business accounting systems (Lako, 2018). Dedicated accounts and cost centers can facilitate expenditure monitoring, budgetary control, and internal accountability, although their existence alone does not establish the completeness of environmental cost recognition. The distinction between identifiable expenditure categories and comprehensive environmental accounting remains relevant because ecological impacts, environmental liabilities, and future restoration obligations may require additional assessment beyond the recording of routine operational expenses.

Environmental budget allocation provides documentary evidence of how the Lahendong Area incorporates environmental responsibilities into its operational financial planning. The reported budget information covers the period from 2021 to 2025 and distinguishes expenditures for water pollution control, air pollution control, hazardous and toxic waste management, other environmental management activities, and community empowerment. Table 1 presents the original budget figures alongside company profit information, with the numerical values and source classifications retained as provided in the research material. The environmental budget categories indicate that financial resources are assigned to several distinct aspects of environmental protection rather than being consolidated exclusively under a single expenditure classification. The availability of categorized budget information is relevant to financial accountability because planned expenditure, actual expenditure, and formal recognition within financial statements represent analytically different stages of accounting practice (Ghozali & Chariri, 2014). The 2025 environmental figures represent budget-plan data, while the company profit information for the same year is limited to the period ending in June 2025. These reporting characteristics must be considered when interpreting budget developments and comparing financial information across the observed years.

Table 1. Environmental Management Budget

Year	WPC	APC	HTWM	Other Environmental Management	Community Empowerment	Company Profit
2021	685,788	685,788	55,475	2.282,172	1.472,004	210.511,400
2022	667,124	667,124	55,475	34.443,954	1.382,338	475.595,781
2023	874,310	874,3104	72,014	5.896,938	1.114,345	546.246,127
2024	761,326	761,326	50,007	8.016,914	1.535,000	557.806,448
2025	850,000	850,000	55,000	8.917,248	1.450,000	270.659,125

Source: PT Pertamina Geothermal Energy, Lahendong Area.
Notes: WPC = Water Pollution Control; APC = Air Pollution Control; HTWM = Hazardous and Toxic Waste Management; 2025 figures refer to budget-plan data; company profit data for 2025 are reported as of June 2025.

The financial information presented in Table 1 demonstrates the presence of environmental budget allocations throughout the five reported years, although the distribution of expenditure varies among management categories. Water pollution control and air pollution control receive identical reported allocations in 2021, 2022, 2024, and 2025, whereas the air pollution control entry for 2023 contains an additional decimal digit that requires confirmation before precise numerical comparisons are conducted. The category of other environmental management exhibits considerable variation across the reporting period, suggesting differences in planned financial requirements that cannot be attributed

to particular operational activities without more detailed expenditure records. Community empowerment allocations are also reported annually, indicating that the company's budget framework extends beyond pollution management to include activities associated with its social responsibilities. Research examining green accounting and corporate performance provides a basis for considering environmental expenditures alongside financial information, although budget figures alone cannot establish a causal relationship between environmental spending and profitability (Achmar & Susanti, 2025). The reported company profit figures should therefore be treated as contextual financial information rather than direct evidence that environmental accounting implementation has increased profitability or produced measurable improvements in environmental performance.

The implementation of green accounting can also be described through the ten indicators identified in the original research material, which distinguish seven implemented indicators from three indicators that have not been implemented at the operating-area level. The implemented indicators comprise waste management, water management, air management, environmental regulatory compliance, environmental budget allocation, community empowerment programs, and the application of Environmental, Social, and Governance (ESG) principles. The remaining indicators concern separate environmental cost reporting, independent environmental reporting at the area level, and environmental cost recognition within financial statements prepared specifically for the operating area. Table 2 presents a descriptive frequency distribution derived from these ten indicators, retaining the binary classification reported in the research material without introducing additional weights or assessment criteria. The calculation identifies seven implemented indicators, representing 70% of the assessed items, while the three remaining indicators account for 30% of the total. This percentage describes the distribution of the reported indicators and should not be interpreted as a statistically validated measure of accounting effectiveness, environmental performance, or corporate sustainability maturity. Sustainability accounting literature emphasizes that organizational accountability also depends on the quality and integration of environmental information, which cannot be established solely through the numerical presence of particular practices (Dina et al., 2024).

Table 2. Descriptive Statistics of Green Accounting Implementation Indicators at PT Pertamina Geothermal Energy, Lahendong Area

Implementation Category	Number of Indicators	Percentage (%)	Indicator Description
Implemented	7	70.00	Waste management; water management; air management; environmental regulatory compliance; environmental budget allocation; community empowerment; ESG implementation
Not implemented at area level	3	30.00	Separate environmental cost reporting; independent environmental reporting at the area level; environmental cost recognition in area-level financial statements
Total	**10**	**100.00**	**All assessed indicators**

The descriptive statistics in Table 2 indicate that the reported implementation of green accounting is more evident in environmental management activities and budgetary arrangements than in independent financial disclosure at the operating-area level. The seven implemented indicators establish the presence of environmental programs and related administrative practices, while the three remaining indicators identify limitations associated with separate environmental financial reporting. These findings require interpretation according to the organizational structure of PT Pertamina Geothermal Energy, because accounting responsibilities performed by corporate headquarters are not necessarily duplicated through independently issued financial statements at Lahendong. Research on green accounting and sustainability reporting reinforces the analytical distinction between the implementation of accounting practices and the presentation of environmental information to stakeholders (Maharani & Akbar, 2025). More detailed transaction records, reporting procedures, and consistent assessment criteria would be necessary to evaluate whether centralized environmental

accounting provides complete, transparent, and sufficiently disaggregated information for managerial and external reporting purposes. The evidence supports the conclusion that green accounting at the Lahendong Area functions through an integrated corporate mechanism connecting environmental activities, budget allocation, and expenditure identification, while independent area-level reporting remains a limitation that warrants attention in strengthening environmental financial accountability.

Waste Management Practices and Environmental Sustainability

Waste management at PT Pertamina Geothermal Energy Tbk, Lahendong Area, is organized around an environmental policy framework that incorporates pollution prevention, resource conservation, and responsibilities arising from geothermal operations. The research material indicates that the company's general environmental policy was ratified in March 2026 and addresses environmental management systems, energy conservation, emission control, domestic waste, and hazardous and toxic waste management. These provisions are operationally relevant because geothermal production and equipment maintenance generate residual materials with different environmental risks and handling requirements. Environmental accounting literature emphasizes the importance of connecting operational environmental responsibilities with identifiable activities, expenditure categories, and organizational control mechanisms (Ompusunggu et al., 2024). Waste management at the Lahendong Area is implemented through activities involving waste identification, collection, temporary storage, treatment, material recovery, and environmental monitoring. Research concerning green accounting and environmental sustainability identifies the integration of environmental responsibilities into corporate operations as an important dimension of sustainable business management (Fratmanisa & Sisdianto, 2025). The reported practices consequently provide a basis for examining environmental management arrangements, although their existence alone does not establish measurable pollution reduction or independently verified regulatory compliance.

The identification of waste generated from operational activities represents an essential stage in the environmental management practices implemented at the Lahendong Area. Domestic waste primarily originates from administrative activities and food consumption, while equipment maintenance produces residual materials requiring specialized treatment, particularly used lubricating oil classified as hazardous and toxic waste. Geothermal production also generates brine and silica deposits, which are managed through operational processes distinct from conventional domestic and maintenance waste. These differences require management procedures that correspond to the physical characteristics, environmental risks, and potential utilization of each residual material. Research on green accounting in industrial waste management emphasizes the importance of distinguishing waste-related activities when identifying environmental responsibilities and associated expenditures (Aminarty et al., 2024). The categorization reported at Lahendong establishes the scope of its waste-management activities, but the available research material does not provide quantitative waste-generation data that would permit comparisons of waste intensity across operational periods.

Hazardous and toxic waste management at the Lahendong Area follows a structured handling procedure extending from the point of generation to treatment by licensed external providers. Used oil and other hazardous residual materials are reportedly packaged, transported to designated temporary storage facilities, recorded in waste-management logs, weighed, and labeled according to their hazardous characteristics. Subsequent transportation and treatment involve authorized third parties, with the movement of hazardous waste documented through a manifest system intended to preserve traceability throughout the handling process. This arrangement reflects the cradle-to-grave principle, under which environmental responsibility encompasses waste generation, storage, transportation, and final treatment rather than ending when materials leave company premises. Research examining the application of green accounting to waste management emphasizes that treatment processes and associated service expenditures constitute relevant components of environmental accountability (Jauhari et al., 2024). The availability of waste records, manifest documentation, and contractor information can potentially support consistency between physical waste-handling activities and the related financial transactions. Environmental accounting nevertheless requires sufficient documentary evidence to establish the completeness of expenditure recognition, while the supplied research material does not contain detailed manifest quantities or treatment-performance measurements.

Geothermal brine management at the Lahendong Area is characterized by the reported reinjection of residual geothermal fluids into designated injection wells rather than their direct discharge

into surrounding water bodies. This procedure is associated with the objective of maintaining geothermal reservoir balance while managing liquid residuals generated during production activities. Material recovery is also reflected in the utilization of plastic bottles for reusable products, the conversion of food residues into compost, and the development of recovered silica deposits into materials supporting plant growth. The reported activities indicate that waste management includes both pollution-control procedures and initiatives intended to recover useful materials from operational residuals. Green accounting provides an analytical basis for examining the financial resources required for such activities, including expenditures associated with hazardous-waste handling, environmental monitoring, and material management (Lako, 2018). Table 3 presents descriptive statistics derived from the original hazardous and toxic waste management budget data for 2021–2025, allowing the financial allocation pattern to be examined without introducing unsupported waste-volume or treatment-efficiency estimates.

Table 3. Descriptive Statistics of Hazardous and Toxic Waste Management Budget at PT Pertamina Geothermal Energy, Lahendong Area, 2021–2025

Year	HTWM Budget (Million IDR)	Annual Change (%)
2021	55.475	—
2022	55.475	0.00
2023	72.014	+29.81
2024	50.007	−30.56
2025*	55.000	+9.98
Mean (2021–2024)	**58.243**	—
Minimum (2021–2024)	**50.007**	—
Maximum (2021–2024)	**72.014**	—
Range (2021–2024)	**22.007**	—

The descriptive statistics presented in Table 3 demonstrate fluctuations in the financial allocations designated for hazardous and toxic waste management during the observed reporting period. The budget remained at IDR 55.475 million in 2021 and 2022 before increasing to IDR 72.014 million in 2023, representing an annual increase of approximately 29.81%. A subsequent reduction of 30.56% occurred in 2024, when the reported allocation declined to IDR 50.007 million, followed by a planned increase of 9.98% to IDR 55.000 million in 2025. The mean annual allocation for 2021–2024 was approximately IDR 58.243 million, with a minimum of IDR 50.007 million, a maximum of IDR 72.014 million, and a range of IDR 22.007 million. These variations indicate changes in budgeted financial resources, although they cannot independently establish whether hazardous-waste generation, treatment requirements, or operational efficiency increased or decreased during the corresponding years. Research linking green accounting with company performance suggests that environmental expenditure information can contribute to organizational evaluation, but interpreting financial outcomes requires evidence beyond the existence or magnitude of budget allocations (Achmar & Susanti, 2025). The statistical results therefore establish a descriptive financial pattern rather than a causal relationship between waste-management spending and environmental performance, particularly because realized expenditure and quantitative treatment records are not available.

Environmental monitoring constitutes another operational component supporting waste-management accountability at the Lahendong Area. The research material describes quarterly evaluation through Environmental Management Plan and Environmental Monitoring Plan reporting, commonly identified as RKL-RPL, alongside monitoring activities associated with the PROPER environmental performance assessment framework. These activities are intended to document environmental conditions, monitor management responsibilities, and provide information for evaluating operational practices against applicable requirements. The integration of routine monitoring with waste-management procedures creates an administrative basis for identifying environmental issues and determining whether additional management responses may be necessary. Research examining green accounting and business continuity highlights the relevance of environmental information for connecting pollution prevention with the organizational management process (Ariani & Zulhawati,

2023). The supplied material does not include quantitative monitoring results, measured pollutant concentrations, or comparative environmental assessment scores, preventing a statistical determination of compliance levels or environmental improvement during the research period.

The financial implications of waste-management activities are reflected in their connection with the company's General Ledger accounts, environmental service classifications, and operational cost centers. Expenditures associated with hazardous-waste transportation, third-party treatment, environmental monitoring, domestic waste management, and conservation activities are identified within the broader financial administration arrangements of PT Pertamina Geothermal Energy. The centralized accounting structure separates operational implementation at Lahendong from the organizational authority responsible for processing and reporting financial transactions. Previous research conducted at the same operating area provides a relevant reference for understanding the implementation of environmental accounting within the company's organizational arrangements (Mapasa et al., 2023). The expenditure allocations in Table 3 demonstrate the presence of a specific hazardous-waste management budget, but they do not identify the precise amounts spent on storage, transportation, treatment, or individual waste-handling activities. Research on green accounting and sustainability reporting indicates that environmental accountability involves not only the availability of financial information but also its organization and communication through corporate reporting mechanisms (Maharani & Akbar, 2025). A more detailed connection between environmental service accounts, activity records, and budget realization would strengthen the capacity to assess expenditure efficiency and the financial implications of different waste-management procedures.

The waste-management practices reported at the Lahendong Area demonstrate the operational relationship between environmental policies, hazardous-waste handling, geothermal brine reinjection, material utilization, and periodic monitoring. These activities provide identifiable operational evidence that can be related to environmental expenditure classifications within the company's integrated accounting system. Research on green accounting and environmental performance supports examining the relationship between organizational environmental practices and accounting information without assuming that program implementation automatically produces measurable environmental improvements (Susilawati et al., 2025). The descriptive budget statistics indicate variations in resources allocated to hazardous-waste management, although the absence of waste-volume data, treatment outcomes, and realized expenditure limits conclusions concerning financial and environmental efficiency. Material recovery initiatives and environmental monitoring may provide a substantive basis for sustainability-related communication, but their contribution to corporate reputation cannot be established without evidence concerning stakeholder assessments. Waste management can consequently be understood as an operational foundation of environmental accountability at the Lahendong Area, providing relevant activities and financial information for examining the relationship between green accounting and the company's sustainability image.

Sustainability Image and the Integration of Environmental, Social, and Governance Practices

The sustainability image of PT Pertamina Geothermal Energy Tbk, Lahendong Area, is associated with the relationship between environmental management, community engagement, and corporate governance practices implemented within its operational environment. The research material identifies environmental protection, social responsibility, organizational integrity, and stakeholder communication as interconnected elements through which the company presents its commitment to sustainable operations. These elements suggest that sustainability image should be understood as a multidimensional organizational attribute rather than a promotional representation derived exclusively from corporate communication. Corporate image literature emphasizes the relationship between organizational conduct, communicated identity, and the impressions developed by external stakeholders (Sugianto, 2020). Sustainability-oriented accounting further extends this relationship by emphasizing the importance of environmental and social information in communicating corporate responsibilities beyond conventional financial performance (Solovida et al., 2021). The reported environmental programs and community initiatives at Lahendong provide identifiable activities against which the substance of corporate sustainability representations can be examined. Their existence nevertheless establishes evidence of organizational actions rather than direct proof of favorable public perceptions, because the available findings do not provide independently measured stakeholder-image assessments.

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Community engagement represents an important component of the company's sustainability-oriented activities because geothermal operations take place in geographical proximity to residential communities. The research material describes social mapping as an organizational practice used to identify local conditions, community needs, and opportunities for implementing relevant development programs. This approach indicates that community initiatives are intended to reflect the characteristics of their intended beneficiaries rather than follow a uniform model across different social environments. Corporate social responsibility scholarship provides a basis for interpreting such activities as organizational responsibilities associated with stakeholder relationships and the social consequences of business operations (Hadi, 2019). Programs developed from identified community needs may strengthen the relevance of corporate contributions, although their effectiveness depends on continuity, implementation quality, and the benefits experienced by participants. The distinction between program implementation and public evaluation remains important because favorable organizational intentions do not independently establish the level of trust or acceptance developed among surrounding communities.

The SetorJo Waste Bank program provides a specific example of how environmental management activities are connected with community empowerment initiatives at the Lahendong Area. The program is described as facilitating the utilization of plastic waste through activities that transform discarded materials into resources with potential economic benefits for community participants. This arrangement extends waste-management activities beyond internal pollution control by incorporating opportunities for community participation and productive material utilization. Research on sustainable development emphasizes the relevance of integrating environmental protection, economic opportunities, and social welfare into organizational development initiatives (Pertiwi, 2017). The relationship between green accounting and sustainable business practices also provides an analytical foundation for examining whether resource-management initiatives contribute to environmental responsibility and organizational value creation (Putra & Katuruni, 2025). The SetorJo program consequently represents an identifiable connection between corporate environmental activities and community-oriented initiatives, although the research material does not provide numerical evidence concerning waste recovery, participant income, or program-generated economic returns. Its relevance to sustainability image lies in the opportunity for stakeholders to observe the company's environmental and social contributions through concrete activities rather than through sustainability statements alone.

Environmental risk management constitutes another important element of the organizational practices associated with sustainability image at the Lahendong Area. The research material describes the assessment of potential environmental and operational risks before activities are implemented, followed by supervision during implementation and evaluation after activities have been completed. This sequence indicates that environmental responsibility is incorporated into organizational planning and control processes rather than confined to corrective measures after environmental problems have occurred. Research on green economy implementation supports the importance of integrating environmental considerations into economic activities through preventive management and institutional responsibility (Ali et al., 2021). The company's reported environmental, social, and governance arrangements also provide an analytical structure for distinguishing operational risk controls, community development initiatives, and organizational accountability mechanisms. Table 4 synthesizes these dimensions using the documented practices described in the research material while distinguishing observable corporate activities from sustainability-image outcomes that have not been independently measured.

Table 4. Synthesis of Environmental, Social, and Governance Practices Supporting Sustainability Image at PT Pertamina Geothermal Energy, Lahendong Area

Sustainability Dimension	Reported Corporate Practices	Implications for Sustainability Image
Environmental	Environmental risk assessment, hazardous-waste management, brine reinjection, waste utilization, and routine environmental monitoring	Provides observable evidence of environmental responsibility and pollution-prevention activities

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Social	Community social mapping, CSR and TJSL initiatives, SetorJo Waste Bank, and community empowerment activities	Establishes opportunities for stakeholder participation and locally relevant social contributions
Governance	Organizational integrity, anti-corruption principles, environmental supervision, periodic evaluation, and centralized corporate accountability	Provides a governance basis for the consistency and credibility of corporate sustainability commitments
Sustainability Communication	Communication of environmental initiatives, community programs, and sustainability-related organizational activities	Supports the presentation of sustainability commitments, subject to consistency with documented practices
Program Continuity and Evaluation	Maintenance of existing initiatives, assessment of community needs, identification of program-development opportunities, and evaluation of community responses	Provides a basis for adapting sustainability initiatives to changing environmental and social requirements

The synthesis presented in Table 4 demonstrates that sustainability-related activities at the Lahendong Area extend across environmental management, community development, governance, organizational communication, and program evaluation. These dimensions are functionally connected because environmental activities provide operational evidence, community initiatives establish opportunities for social participation, and governance arrangements influence how organizational responsibilities are administered. The integration of these activities is consistent with sustainability management approaches that connect environmental performance, accounting information, and organizational responsibilities within broader corporate systems (Richard et al., 2026). The synthesis also identifies a distinction between the existence of reported practices and the formation of sustainability image among external stakeholders, since documentary evidence of corporate activity cannot independently establish favorable public evaluations. Research on green accounting and sustainability-report quality emphasizes the importance of informative and credible disclosure in communicating environmental responsibilities (Maharani & Akbar, 2025). The value of sustainability communication therefore depends on its correspondence with documented operational activities, the continuity of environmental and social programs, and the consistency of organizational accountability arrangements. The Lahendong findings support an assessment of these organizational foundations but do not establish a quantified relationship between individual ESG practices and measured corporate reputation.

Corporate governance provides an institutional foundation for connecting sustainability initiatives with organizational accountability and responsible decision-making. The research material identifies integrity and anti-corruption principles as components of the governance practices supporting the company's sustainability-oriented organizational arrangements. These principles complement environmental and social responsibilities by establishing expectations concerning the administration of corporate resources and the conduct of organizational activities. The centralized accounting arrangements identified in the Lahendong Area also indicate that environmental expenditure information is administered through a broader corporate structure rather than independently reported by the operating unit. Research concerning green accounting and corporate value emphasizes the relevance of governance arrangements when examining how environmental information relates to organizational accountability and financial decision-making (Ramadhanti & Machdar, 2025). The available evidence nevertheless does not establish the effectiveness of individual governance controls or demonstrate that governance practices have directly changed stakeholder perceptions of the company.

Sustainability communication at the Lahendong Area is described through the presentation of environmental programs, community initiatives, and organizational contributions associated with geothermal operations. The research material identifies communication and storytelling as instruments used to explain company activities while considering how surrounding communities experience the company's presence. This distinction is analytically important because sustainability image is influenced not only by the information an organization communicates but also by the extent to which

stakeholders recognize that information as consistent with observable practices. Corporate reporting materials document Pertamina Geothermal Energy's broader environmental and community commitments, providing organizational context for the communication of sustainability responsibilities (Pertamina Geothermal Energy, 2019). The relationship between green accounting, environmental performance, and corporate outcomes has also been examined in energy-related industries, although such relationships cannot automatically be interpreted as evidence of favorable stakeholder perceptions at a specific operating area (Olaoye & Alao, 2023). Differences between intended organizational positioning and stakeholder evaluations may emerge when sustainability claims are not supported by sufficiently transparent information or directly observable contributions. The available research material supports the identification of corporate communication activities and sustainability-related programs, but a definitive assessment of public image would require direct evidence from community members or other relevant stakeholder groups.

Maintaining a sustainability-oriented organizational image at the Lahendong Area involves the continuity of environmental and social initiatives, periodic evaluation of community needs, identification of opportunities for program development, and communication of corporate activities. The research material indicates that these strategies are intended to preserve the relevance of existing programs while allowing adjustments in response to changing community circumstances and operational requirements. The development of environmental initiatives that produce potential social or economic benefits also reflects an approach in which sustainability activities are connected with broader organizational responsibilities. Literature on green business recognizes that environmental initiatives require integration into business practices rather than reliance on isolated promotional activities or short-term commitments (Friend, 2009). The findings suggest that the role of green accounting in supporting sustainability image is primarily indirect, operating through the documentation of environmental expenditures, accountability for operational activities, and the availability of information relevant to sustainability communication. The contribution of the Lahendong case lies in distinguishing documented corporate sustainability practices from stakeholder perceptions that remain unmeasured, while identifying the organizational conditions through which environmental accounting and ESG implementation may support a more substantiated sustainability image.

CONCLUSION

The findings indicate that PT Pertamina Geothermal Energy Tbk, Lahendong Area, applies green accounting through an integrated corporate system rather than an independent accounting structure at the operating-area level. Environmental management activities are conducted locally, while financial administration and reporting remain under the authority of the head office. Environmental costs are identifiable through General Ledger accounts, cost centers, and budget allocations associated with pollution control, hazardous-waste management, and other environmental services. Seven of the ten assessed implementation indicators were reported as present, yielding a descriptive coverage of 70%, rather than a statistically validated measure of accounting effectiveness. The three indicators not implemented at the area level concern separate environmental cost reporting, independent environmental reporting, and recognition of environmental costs in area-level financial statements. The reported hazardous-waste management budgets fluctuated during 2021–2025, although the absence of expenditure realization and waste-volume data prevents conclusions about cost efficiency or environmental outcomes. These findings characterize green accounting at Lahendong as a mechanism for connecting site-level environmental responsibilities with corporate cost management and accountability.

Waste-management practices encompass hazardous-waste storage and treatment through authorized providers, brine reinjection, material reuse, and periodic environmental monitoring. Community-oriented initiatives, including the SetorJo Waste Bank, link selected environmental activities with opportunities for local participation and material recovery. Environmental protection, social engagement, and governance measures collectively provide documented foundations for the company's sustainability-related communication. The research does not establish that these measures increase public trust or improve corporate reputation because independent stakeholder-perception data were not available. The principal contribution is the distinction between the documented implementation of green accounting and the unmeasured reception of sustainability claims. Strengthening the traceability of environmental expenditures and the consistency between operational

records and corporate disclosures would improve the basis for organizational evaluation. Future research should integrate realized environmental costs, quantified waste-management results, and stakeholder assessments to examine whether these practices translate into measurable sustainability-image outcomes.

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