

## Strategic Management Accounting as a Driver of Climate Action Within Indonesian Enterprises

Yanuar Ramadhan<sup>1</sup>, Yusup Setiawan<sup>2</sup>, Ucok Jimmy<sup>3</sup>

<sup>123</sup>Universitas Esa Unggul, Indonesia

Correspondent: [yanuar.ramadhan@esaunggul.ac.id](mailto:yanuar.ramadhan@esaunggul.ac.id)<sup>1</sup>

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**ABSTRACT:** Climate change is a global challenge that demands active responsibility from the corporate sector, particularly the energy industry, which is the largest contributor to carbon emissions in Indonesia. In this context, Strategic Management Accounting (SMA) plays a crucial role in integrating business strategy with sustainability objectives to support the achievement of Sustainable Development Goal (SDG) 13 – Climate Action. This study aims to analyze how SMA helps energy companies to design, implement, and evaluate climate strategies through governance mechanisms, management control systems, and environment-based performance metrics. This study offers a unique contribution by positioning SMA as an institutional mediator—a role that remains underexplored in the Indonesian context. The research employed a qualitative approach using the Systematic Literature Review (SLR) method. The study was conducted through the selection and synthesis of academic literature, research reports, and publications from international institutions relevant to the context of energy companies in Indonesia. The findings reveal that SMA acts as an institutional bridge connecting external pressures—such as regulatory mandates, investor expectations, and professional norms—with internal mechanisms like management control systems, performance metrics, and incentive structures. The integration of the Sustainability Balanced Scorecard (SBSC), carbon accounting, and internal carbon pricing enhances the alignment between financial performance and climate objectives. This study concludes that SMA plays a transformative role in embedding sustainability into corporate governance and operational systems. The findings underscore the need for corporate leaders and policymakers to strengthen SMA-based governance architectures, as doing so can significantly enhance Indonesia's progress toward SDG 13 and accelerate its broader transition toward a low-carbon economy.

**Keywords:** Strategic Management Accounting, SDG 13, Climate Change, Sustainability Balanced Scorecard.



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## INTRODUCTION

As one of the world's largest greenhouse gas emitters, Indonesia faces an acute and immediate climate challenge that requires coordinated national and corporate responses. The country's rising vulnerability, reflected in the increasing frequency and intensity of climate-induced disasters,

underscores the urgency of strengthening mitigation and adaptation efforts, particularly within emission-intensive sectors such as energy and industry. Climate change itself represents an increasingly pressing global issue that demands immediate and coordinated action, as both the frequency and severity of climate induced natural disasters continue to escalate (Wang et al., 2023). The global community's shared commitment to curbing greenhouse gas (GHG) emissions is embodied in the Sustainable Development Goals (SDGs), particularly Goal 13, which calls for urgent and collective measures to combat climate change and its effects while strengthening resilience and adaptive capacity across nations (Naseer et al., 2025). Within this framework, the private sector holds a pivotal role in embedding environmental considerations into sustainability-driven business strategies (Cardillo & Basso, 2025). However, in Indonesia, the adoption of strategic and managerial systems that support this global agenda remains hindered by numerous challenges and a persistent gap between national policy ambitions and corporate-level implementation.

Indonesia bears substantial responsibility for mitigating its carbon footprint (Cahyono et al., 2022). According to Climate Watch (2023), the country's total emissions in 2022 were approximately 1.47 billion tons of CO<sub>2</sub>e, positioning Indonesia as the seventh-largest global emitter. In response, the Indonesian government has reaffirmed its commitment by setting an uncompromising Net Zero Emission (NZE) target for 2060 (Husada & Joesoef, 2022). A report by the Ministry of Environment and Forestry (Kementerian Lingkungan Hidup dan Kehutanan, 2022) highlights that the energy sector remains the largest source of emissions, with an annual growth rate of 36%, underscoring its critical importance in national climate policy. These findings demonstrate that the energy and industrial sectors must play a central role in advancing climate mitigation efforts.

Despite these commitments, corporate-level implementation of sustainability initiatives still reveals a significant gap between policy formulation and actual practice. Climate-related transparency among Indonesian companies also remains low (Yuliana & Wedari, 2023). The Carbon Disclosure Project (CDP, 2022) reported that only 52 companies in Indonesia responded to disclosure requests regarding their emissions and climate strategies, and merely 22 had scientifically validated emission reduction targets under the Science Based Targets initiative (SBTi, 2023). These figures underscore a persistent implementation gap, showing that national commitments are not yet matched by the strategic and operational readiness of companies to manage climate risks in a structured and comprehensive manner.

In today's corporate landscape, sustainability is no longer a symbolic act of social responsibility; it has evolved into a strategic dimension embedded within business decision-making processes (Husnah & Fahlevi, 2023). Strategic Management Accounting (SMA) plays a vital role in assisting firms in designing, executing, and evaluating strategies aligned with environmental sustainability goals (Setyawan et al., 2023). The importance of SMA is further reinforced by growing external pressures from investors, consumers, and regulators demanding transparency in environmental and social performance (Nuraini & Andrew, 2023). Nevertheless, the level of SDG disclosure, particularly in relation to SDG 13, remains limited among Indonesian firms (Wicaksono, 2023). Although positive examples such as PT Unilever Indonesia and PT Pertamina—recognized by the Asia Sustainability Reporting Rating (ASRRAT) for integrating sustainability reporting into business strategy (Awanda & Bayangkara, 2025) illustrate best practices, such initiatives have not

yet become widespread. More comprehensive frameworks are required to extend these successes across diverse industrial sectors.

Within the national context, Indonesia's push toward a green economy and its target of achieving net-zero carbon emissions by 2060 intensify the urgency for corporate transformation (Sabriyana, 2024). Emerging policies such as green reporting, carbon taxation, and sustainability performance measurement systems call for the proactive involvement of the accounting profession in facilitating this transition (Tumanggor, 2024). However, existing Indonesian scholarship still lacks depth in exploring how SMA specifically contributes to achieving SDG 13 (Negara et al., 2025). Most studies have primarily focused on sustainability reporting (ESG reporting) or corporate social responsibility (CSR), while overlooking the managerial accounting perspective in climate-related strategic decision-making (Zuherman & Sisdianto, 2025).

In global contexts, several tools, including the Sustainability Performance Measurement Framework (SPMF) and the Sustainability Balanced Scorecard (SBSC) have proven effective in linking sustainability objectives with business goals through the integration of environmental and social metrics into corporate performance systems (Safitri et al., 2025). However, their application in Indonesia remains limited, particularly in relation to climate change mitigation and carbon emission management (Yaqin et al., 2025). The findings of Ramadhan et al. (2023) reinforce the strategic importance of the accounting profession in addressing climate change by internalizing environmental considerations into both financial reporting and strategic management processes. Hence, exploring how SMA can be adapted to enhance corporate contributions toward SDG 13 becomes increasingly relevant.

The theoretical foundation of this study integrates several key perspectives to establish a comprehensive conceptual framework. Stakeholder Theory, proposed by Freeman (1984), posits that firms are accountable not only to shareholders but also to all stakeholders affected by their operations, including communities, governments, and the environment. In the context of climate change, this theory highlights the need for corporations to incorporate social and ecological considerations into all strategic and operational decisions. Gray et al. (2014) further argue that the theory provides a normative rationale for embedding SDG principles within accounting systems and managerial practices.

In addition, Langfield-Smith (2008) Strategic Management Accounting Theory provides an analytical lens for understanding how financial and non-financial information can be strategically utilized in decision-making processes. SMA encompasses various techniques—such as the balanced scorecard, activity-based costing (ABC), and environmental cost analysis—that enable firms to internalize climate risks into strategic and operational planning (Burritt & Schaltegger, 2010). This approach empowers management to translate sustainability commitments into measurable, long-term business actions.

Furthermore, Institutional Theory (DiMaggio & Powell, 1983) and Legitimacy Theory (Suchman, 1995) are employed to explain the external forces shaping corporate engagement in climate initiatives. Institutional Theory elucidates how coercive, normative, and mimetic pressures influence organizations to align with societal norms and global sustainability standards. Meanwhile, Legitimacy Theory posits that corporate participation in environmental initiatives helps organizations gain societal approval and maintain institutional credibility.

The achievement of SDG 13 can be assessed through indicators such as the extent and quality of carbon emissions disclosure, the adoption of Net Zero or Science-Based Targets, participation in global reporting initiatives like CDP and GRI, and the implementation of climate mitigation and adaptation measures at both the corporate and national levels (Lubis & Aryansah, 2023). These indicators reflect how organizations strategically respond to external pressures to enhance environmental sustainability. Within this context, SMA serves as an internal mechanism that enables firms to address such pressures systematically, measurably, and consistently.

Prior research on sustainability practices in Indonesia has largely centered on CSR disclosure, ESG reporting, and broader sustainability communication, while providing only limited understanding of how Strategic Management Accounting (SMA) functions operationally to support climate-related strategies in emerging economies. This gap becomes evident when observing the minimal number of studies that investigate how SMA tools—such as environmental budgeting, performance measurement systems, and management control mechanisms—are incorporated into managerial decision-making to strengthen climate mitigation efforts. Although the literature on climate governance increasingly emphasizes transparency, reporting quality, and accountability structures, the managerial accounting perspective remains insufficiently explored. Addressing this shortfall, the present study contributes by developing an integrative framework that explicitly connects SMA practices to the pursuit of SDG 13 within Indonesia's energy sector, offering a fresh analytical perspective on the role of SMA as an institutional conduit for embedding climate targets into organizational strategy. Through this approach, the study shifts the academic discussion beyond disclosure-focused analyses toward a more substantive exploration of managerial systems that translate climate commitments into concrete action.

By integrating both empirical evidence and theoretical perspectives, this study seeks to critically evaluate the role of Strategic Management Accounting (SMA) in advancing the achievement of Sustainable Development Goal 13 within the Indonesian context. The findings are expected to enrich the body of knowledge on sustainability accounting while providing practical insights for corporate managers, regulators, and accounting practitioners in designing management information systems that support the transition toward low-carbon business models and the realization of Indonesia's Net Zero Emission commitment.

## **METHOD**

This research employs a qualitative approach, utilizing the Systematic Literature Review (SLR) method as its principal strategy to develop a thorough and in-depth comprehension of how Strategic Management Accounting (SMA) contributes to the attainment of SDG 13, which focuses on climate change mitigation and adaptation within the Indonesian context. The review process was conducted in accordance with the PRISMA framework to ensure methodological rigor and transparency. Relevant scholarly articles published between 2010 and 2025 were systematically retrieved from reputable databases, Web of Science, Scopus, and Google Scholar, using the keywords 'Strategic Management Accounting,' 'SDG 13,' and 'Climate Change,' yielding a total of 25 peer-reviewed papers.

The data sources for this research are academic articles, research reports, publications from international institutions, and policy documents obtained through reputable databases. The selected literature was screened based on relevance to strategic management accounting and sustainability to ensure validity and thematic alignment with the research objectives. To enhance transparency, the review applied explicit inclusion criteria: (1) peer-reviewed journal articles or reputable institutional reports; (2) indexed in Scopus or Web of Science; (3) directly relevant to SMA, climate change mitigation, or SDG 13; and (54 empirical or conceptual studies situated in emerging economies. Exclusion criteria included: non-academic publications, articles not aligned with SMA or climate-related themes, papers lacking methodological clarity, opinion pieces, and duplicates.

The selected literature was screened and coded using thematic synthesis, involving three analytical steps: (1) initial open coding to identify recurring SMA–climate themes, (2) axial coding to cluster themes into governance, management control systems, performance measurement, and carbon-related costing, and (3) selective coding to integrate findings into higher-order theoretical categories. This synthesis process ensured that the literature selected was both relevant and methodologically sound, allowing the analysis to reflect the actual contribution of SMA to sustainability and climate mitigation practices in Indonesia.

Importantly, the synthesis does not merely summarize existing works; it produces a new conceptual contribution. Specifically, the review generates a proposed SMA–SDG 13 Integration Framework tailored to Indonesia’s energy sector, demonstrating how SMA can function as a structured mechanism for internalizing climate objectives into managerial processes.

## RESULT AND DISCUSSION

The SLR reveals key findings regarding the role of Strategic Management Accounting (SMA) in supporting SDG 13 (Climate Action). The SLR identifies several recurring themes across the reviewed studies.

**Table 1.** Key Findings from Reviewed Literature

No	Author (s)	Year	Study Focus	Key Findings	Moderating Factors	Geographic Context
1	Burritt & Schaltegger	2010	Sustainability Accounting	Sustainability accounting and environmental reporting help organizations link financial decisions with ecological impacts	Implementation of environmental management system	Global
2	Langfield-Smith	2008	Strategic Management Accounting	Integration of financial and non financial information enhances the strategic relevance of long-term	Organizational complexity and managerial support	Australia



No	Author (s)	Year	Study Focus	Key Findings	Moderating Factors	Geographic Context
				environmental performance		
3	Kaplan & Norton	1992	Balanced Scorecard	The Sustainability Balanced Scorecard (SBSC) translates targets into key performance indicators (KPIs) and feedback control mechanisms	Strategic leadership (tone at the top)	Global
4	Gray et al.	2014	Accountability & Legitimacy Theory	Social and environmental accountability broadens corporate orientation beyond financial performance	Public legitimacy pressures and regulatory expectations	Global
5	DiMaggio & Powell	1983	Institutional Theory	Coercive, normative, and mimetic pressures drive the adoption of sustainability practices	Regulations, professional norms, and industry benchmarking	Global
6	Wardhani	2023	Sustainability Performance Measurement	Sustainability performance measurement helps firms align SDG objectives with business strategies	Corporate governance systems and data availability	Indonesia
7	Awanda & Bayangkara	2025	Corporate Sustainability Reporting	The ASRRAT award reflects strong integration between sustainability reporting and corporate strategy	Leadership commitment and board sustainability mandates	Indonesia
8	Yuliana & Wedari	2023	ESG Disclosure & Carbon Intensity	ESG disclosure and carbon intensity influence financial performance in high-polluting industries	Regulation and investor pressure	Indonesia
9	Setyawan et al.	2023	Strategic Role of SMA	Strategic Management Accounting (SMA) acts as a “design bridge” linking external pressures with internal sustainability systems	Maturity of management control systems	Indonesia
10	Tumanggogor	2024	Green Reporting & Carbon Tax Policy	Green reporting and carbon tax regulations reinforce the accounting profession's role in the green economic transition	Government policy support	Indonesia

No	Author (s)	Year	Study Focus	Key Findings	Moderating Factors	Geographic Context
11	Ramadhan et al.	2023	Environmental Accounting & Climate Action	Accountants play a strategic role in embedding climate risk information into financial and strategic reporting toward Net Zero Emission 2060	Government policy and professional standards	Indonesia
12	Handayani & Sari	2025	Environmental Accounting & Material Flow Cost Accounting in Mining Sector	Environmental Accounting has no significant impact on SDGs due to formal implementation; Material Flow Cost Accounting and Environmental Performance positively affect SDGs through efficiency and waste reduction	Regulatory pressure and environmental performance initiatives	Indonesia
13	Karyanto & Martiana	2020	Accountants' Role in Achieving SDGs	Accountants contribute to SDGs achievement by ensuring accountability, transparency, and the integration of PSAK standards to promote ethical, sustainable corporate behavior	Implementation of PSAK standards, corruption eradication, and government–corporate collaboration	Indonesia
14	Meng et al.	2023	Land Use Carbon Emission Accounting & Prediction	Land-use changes significantly affect regional carbon emissions; construction land is the largest emission source	Suggests SMA adoption for modeling, monitoring, and mitigating carbon emissions	China
15	Alsaifi et al.	2019	Carbon Disclosure & Financial Performance	Positive relationship between carbon disclosure and financial performance under strong environmental policy; carbon transparency improves investor trust and market value	Carbon reporting integration in improving environmental accountability and corporate value under regulatory pressure	United Kingdom
16	Gulluscio et al.	2020	Climate Change Accounting & Reporting for SDG 13	The study synthesizes 85 articles from 1999–2018 on climate change accounting and reporting. It finds that	Institutional pressures, interdisciplinary collaboration,	Global

No	Author (s)	Year	Study Focus	Key Findings	Moderating Factors	Geographic Context
				most studies emphasize sustainability disclosure, carbon and GHG reporting, while few address management control, auditing, and strategy.	and regulatory maturity	
17	Behera et al.	2024	Renewable Energy, & Political Stability for SDG 13	Renewable energy consumption and green finance significantly reduce CO <sub>2</sub> emissions, while political stability shows mixed effects. The interaction of political stability × renewable energy and green finance × renewable energy further enhances emission reduction	Political stability and green finance moderate the renewable energy emission relationship, amplifying the decarbonization effect in politically stable economies	Emerging economies (e.g., Indonesia, India, Brazil, China, South Africa, etc.)
18	Wahyun ingrum et al.	2025	Corporate Governance & Carbon Disclosure for SDG 13	Board size, gender diversity, foreign ownership, and CSR committee positively influence both carbon emission disclosure and carbon performance. Board independence shows insignificant or negative effects. Strong governance enhances the correlation between disclosure and performance	Corporate governance dimensions (board size, gender diversity, foreign ownership, CSR committee) moderate the relationship between disclosure and performance, transforming transparency into tangible carbon outcomes	Indonesia
19	Mahendra et al.	2025	Carbon Disclosure	Environmental performance and firm size are found to have a positive influence on carbon disclosure, whereas financial distress exerts a negative impact. Moreover, corporate governance particularly the role of independent	Corporate governance (independent commissioners) moderates the environmental performance–carbon disclosure relationship with a weakening effect; no	Indonesia



No	Author (s)	Year	Study Focus	Key Findings	Moderating Factors	Geographic Context
				commissioners diminishes the strength of the relationship between environmental performance and disclosure, yet it does not moderate the effects of firm size or financial distress	moderation found for firm size and financial distress	
20	Wiranti et al.	2025	Sustainability Accounting	Sustainability accounting (environmental accounting, sustainability reporting, ERP based accounting systems) improves transparency, accountability, and efficiency, supporting SDGs (especially SDG 12 and SDG 13). However, challenges include inconsistent regulation, high cost, and limited human capital	Institutional framework, regulatory consistency, technological capability, and management awareness act as moderating factors influencing adoption	Indonesia
21	Singh et al.	2024	Artificial Intelligence (AI) & SDGs (including Climate Action)	AI significantly contributes to SDG 13 (Climate Action), and SDG 7. It enhances predictive modeling, resource optimization, and environmental monitoring. However, research is fragmented across regions and disciplines	Technological readiness, data governance, and institutional policy moderate the relationship between AI adoption and SDG outcomes.	Global
22	Erin et al.	2025	SDG Accounting	Identifies seven research themes: (1) SDG practices, (2) determinants, (3) socioeconomic effects, (4) regulatory compliance, (5) SDG indices/models, (6) disclosure/reporting, and (7) studies on SDG	Highlights the importance of accounting as an enabler of SDG measurement and climate accountability (SDG 13). Emphasizes the need for	Global

No	Author (s)	Year	Study Focus	Key Findings	Moderating Factors	Geographic Context
				1–17. Private and hybrid sectors dominate the literature, with limited focus on public entities and SDG compliance	integrating SMA tools such as sustainability scorecards and carbon accounting into reporting systems	
23	Anwar et al.	2022	CO <sub>2</sub> Emissions	Urbanization, financial development, and economic growth are shown to significantly contribute to the rise in CO <sub>2</sub> emissions, whereas the utilization of renewable energy plays a mitigating role by reducing emission levels. Meanwhile, the agricultural sector exhibits a positive yet statistically insignificant relationship with CO <sub>2</sub> emissions	Provides empirical support for SDG 13 and SDG 7 by showing how energy policy and financial development shape emission outcomes; calls for SDG aligned fiscal and governance reforms	15 Asian economies (including Indonesia, China, India, Malaysia, and Thailand)
24	Agbakwuru et al.	2024	Renewable Energy & Strategic Management Accounting	Renewable energy serves as a central enabler of multiple SDGs by reducing carbon emissions, improving energy access, promoting economic growth, enhancing public health, and supporting sustainable cities. Barriers include high costs, technological limitations, and regulatory inconsistencies	Demonstrates that renewable energy integration supports SMA through carbon accounting, green budgeting, and sustainability reporting systems that align corporate strategies with SDG 13 (Climate Action)	Global
25	Alsharari	2024	Strategic Management Accounting	SMA evolves from operational to strategic focus by integrating customers, HR, processes, and finance. Organizational restructuring promotes decentralization, delegation, and	Strengthens the theoretical foundation for SMA as a strategic enabler of public-sector transformation. Demonstrates that SMA tools	Jordan

No	Author (s)	Year	Study Focus	Key Findings	Moderating Factors	Geographic Context
				learning. SMA both facilitates and is influenced by organizational change	can operationalize performance measurement and accountability aligned with SDG 13 (Climate Action)	
26	Idrus & Nur	2024	SDGs 13.1.3 Goal implementation	Implementation of Goal 13.1.3 (regional disaster management strategy) is classified as anthropocentric and shallow environmentalism	Local governance capacity, inter-institutional coordination, data availability, and alignment between national and local action plans	Indonesia

The synthesis of prior studies shows clear contrasts between global and Indonesian developments in SMA-driven climate action. Global research reflects more mature carbon accounting practices—particularly Scope 3 disclosures—while Indonesian studies reveal slower adoption due to regulatory ambiguity, limited data systems, and uneven managerial capacity. Although both contexts recognize the strategic relevance of tools such as the Sustainability Balanced Scorecard (SBSC), global evidence more convincingly demonstrates their effectiveness in operationalizing climate strategies.

Governance consistently appears as a critical moderating factor influencing the impact of sustainability-oriented SMA practices. These divergences highlight the novelty of this study, as Indonesian literature remains fragmented and focused primarily on disclosure rather than managerial control systems. By synthesizing these differences, this study identifies institutional pressures unique to Indonesia—such as fossil-fuel dependence, the dominance of state-owned enterprises, and evolving regulatory frameworks—and proposes a more context-specific SMA–SDG 13 integration model tailored to the characteristics of the national energy sector.

Literature consistently demonstrates that clarity of the board and sustainability committee mandate, strategic leadership (tone at the top), and the implementation of science-based targets (SBTi) are positively associated with the level of integration of climate metrics into the company's management control system (MCS) and strategy map (Kaplan & Norton, 1992; Awanda & Bayangkara, 2025; Wicaksono 2023). Energy companies that have set Net Zero Emission (NZE) or SBTi targets tend to link CO<sub>2</sub>e emission intensity per unit of production to their operational key performance indicators (KPIs).

Overall, Scope 1 and Scope 2 emissions reporting are more developed than Scope 3, which remains weak in implementation and consistency (Adamsson et al., 2016). Several studies highlight the use of strategic costing approaches such as environmental activity based costing (ABC) and marginal

abatement cost curves (MACC), although these practices have not yet become widely adopted standards in the energy sector (Burritt & Schaltegger, 2010; Langfield-Smith, 2008).

The use of the sustainability balanced scorecard (SBSC) has proven effective in reducing climate targets to lead and lag indicators and feedback control mechanisms. However, several studies have found short-termism in budget planning, where energy price fluctuations often marginalize energy efficiency or decarbonization projects (Kaplan & Norton, 1992; Wardhani, 2023).

The practice of environmental budgeting linked to capital budgeting remains sporadic and not yet systematic. A small number of companies have utilized internal carbon pricing (ICP) as an additional hurdle rate in evaluating high carbon intensity projects, but its implementation is not yet widespread (Burritt & Schaltegger, 2010). Studies show an implementation gap between improving reporting quality (through ASRRAT, GRI, or CDP) and weak strengthening of MCS design and climate-based incentive schemes at the managerial level (Awanda & Bayangkara, 2025; Wicaksono 2023; Gray et al., 2014).

In general, these findings align with international literature, which states that the implementation of SBSC and strategy maps can align climate objectives with business priorities while strengthening the line of sight between strategy and performance (Kaplan & Norton, 1992; Burritt & Schaltegger, 2010). However, the Indonesian context presents significant differences. Historical dependence on fossil fuels, the dominant role of state owned enterprises (SOEs), and complex contractual dynamics make regulatory stability and political economic certainty key determinants in building a decarbonization business case. These conditions explain why Scope 3 reporting and the integration of low carbon investments still lag behind jurisdictions with mature carbon pricing policies.

At this point, this study emphasizes the role of SMA as a "design bridge" capable of transforming institutional pressures into an operationalized system of metrics, targets, and incentives (Setyawan et al., 2023). Furthermore, this study also highlights the need to develop an integration playbook that combines carbon accounting, SBSC, scenario planning, and internal carbon pricing into a comprehensive planning and budgeting cycle. The main obstacles identified, such as the separation of finance and sustainability functions (finance sustainability silos), low data quality, and energy market volatility, can be addressed through strengthening cross functional data governance, implementing climate-based rolling forecasts, and developing incentive systems oriented towards reducing emissions intensity (Gray et al., 2014; Wardhani, 2023).

Furthermore, the SLR results also show that SMA functions as a mechanism for institutionalizing climate strategy, where external pressures from regulations, capital market expectations, and professional norms are translated into the internal design of management control systems (MCS), performance metrics, and incentive schemes that support the achievement of SDG 13. At the implementation level, the use of SBSC and strategy maps allows energy companies to translate decarbonization, energy efficiency, and transition risk mitigation targets into indicators that can be monitored through feedback control mechanisms. Thus, SMA functions as a strategic instrument that connects carbon accounting, environmental budgeting, and environmentally oriented activity based costing (ABC), so that climate benefits and costs can be directly linked to operational decisions and capital allocation policies (Burritt & Schaltegger, 2010; Langfield-Smith, 2008). Overall, these findings reveal a persistent implementation gap: reporting quality has improved, yet the internalization of climate indicators into MCS and incentive structures remains weak.

These patterns align with Institutional Theory, which suggests that coercive (carbon tax, transition pathways), normative (professional standards, investor expectations), and mimetic pressures (benchmarking) shape the adoption of sustainability-oriented SMA practices (DiMaggio & Powell, 1983; Suchman, 1995). At the same time, Stakeholder Theory emphasizes the need for firms to address broader societal and environmental expectations (Freeman, 1984), while the socio-environmental accountability framework (Gray et al., 2014) argues that climate considerations must be incorporated into managerial practices, not just reporting systems. SBSC and strategy maps enable firms to convert climate commitments—such as decarbonization and risk mitigation—into indicators monitored through feedback controls. Thus, SMA emerges as a strategic mechanism that links carbon accounting, environmental budgeting, and ABC to operational decisions and capital allocation, ensuring that climate-related costs and benefits are embedded in long-term planning (Burritt & Schaltegger, 2010).

To deepen the understanding of how SMA can be effectively implemented in Indonesia's climate-sensitive sectors, it is important to first explain why the following international studies are relevant to the Indonesian context. These works offer insights that align with challenges commonly faced by emerging economies—such as inconsistent carbon reporting practices, regulatory gaps, and the need to integrate sustainability into broader economic transitions—making them particularly applicable to Indonesia. Indonesian firms must address enduring structural barriers, including siloed finance–sustainability functions, inadequate data quality, and volatile energy markets. Strengthening cross-functional data governance, deploying climate-based rolling forecasts, and embedding climate metrics into incentive schemes can improve integration. Given Indonesia's reliance on fossil fuels, dominance of SOEs, and evolving regulatory frameworks, SMA must be tailored to local institutional pressures, making tools such as SBSC, scenario planning, and internal carbon pricing critical pillars for operationalizing climate strategy.

A cross-literature analysis including the works of Behera et al. (2024), Erin et al. (2025), and Gulluscio et al. (2020) indicates that the effectiveness of SMA is not solely determined by formal regulatory compliance, but rather by the extent to which it is strategically integrated across reporting, budgeting, and management control systems. Meanwhile, Singh et al. (2024) highlight that the adoption of Artificial Intelligence (AI) and ERP based digital systems can enhance predictive capabilities and improve the accuracy of carbon reporting. Furthermore, Agbakwuru et al. (2024) and Tumanggor (2024) emphasize that green fiscal instruments such as carbon taxes and green bonds serve as external catalysts that accelerate the institutionalization of SMA across sectors. On the other hand, Alsharari (2024) demonstrates that SMA also plays a vital role in the public sector by facilitating governance restructuring and strengthening institutional accountability mechanisms.

Overall, this research enriches the scientific discourse by emphasizing the role of SMA as an institutional mediator capable of transforming external pressures into a concrete incentive target metric architecture to support SDG 13. On the practical side, these findings result in the design of an integration playbook that includes (1) the development of SBSC with climate critical KPIs (CO<sub>2</sub>e intensity, energy mix, and internal carbon price), (2) strengthening MCS through rolling forecasts and climate based scenario planning, (3) integrating environmental budgeting into capital allocation to prioritize low carbon investments, and (4) establishing cross functional data

governance that links sustainability reporting (GRI/CDP) with managerial decision making. Theoretically, these results expand the discourse on the relationship between SMA and institutional theory from a compliance approach to strategic fit by emphasizing that external legitimacy will be more effective when mediated by an SMA design that is integrated into the planning and budgeting cycle (Dimaggio & Powell, 1983, 2010; Langfield-Smith, 2008).

Building on these findings, this study provides a clear conceptual advancement by framing Strategic Management Accounting (SMA) as an institutional mechanism that actively converts external climate pressures into structured systems of control, measurement, and managerial incentives. In contrast to earlier studies that treat SMA instruments as discrete or stand-alone techniques, this research offers a more holistic view by showing how SMA operates as the integrating framework that connects regulatory demands, governance arrangements, and strategic decision-making processes. To articulate this contribution more explicitly, the study introduces a context-specific SMA–SDG 13 integration model for Indonesia’s energy sector, demonstrating how carbon accounting, the Sustainability Balanced Scorecard (SBSC), scenario planning, and internal carbon pricing can be systematically embedded within organizational planning, budgeting, and performance management cycles. This framework highlights the study’s core novelty by reconceptualizing SMA not merely as a tool for reporting or cost analysis, but as a strategic institutional driver that enables firms to internalize and operationalize climate commitments across their management systems.

As an SLR-based study, this research is subject to several methodological constraints, including the possibility of publication bias, the predominance of literature focusing on disclosure rather than MCS design, the heterogeneity of energy sector characteristics that limit the generalizability of the results, and differences in the definition of climate indicators (e.g., emissions intensity per unit of output) that complicate comparisons between studies. As a follow-up, future research is recommended to combine SLR with longitudinal case studies of high carbon intensity energy companies to explore the causal mechanisms of SMA integration and climate strategy. Furthermore, internal policy experiments such as piloting emission reduction based incentive schemes and quasi experimental designs to measure the impact of internal carbon pricing on investment decisions are needed. Collaboration between academics and practitioners is also crucial to formulate a more uniform taxonomy of climate KPIs, strengthen data governance, and develop protocols for integrating carbon accounting with risk management and capital allocation. Therefore, the results of this study provide a more comprehensive understanding that the success of achieving SDG 13 in the Indonesian energy sector is determined not only by sustainability reporting, but also by the extent to which SMA is operationalized within the organization's strategic objectives, budget systems, and incentive schemes.

## **CONCLUSION**

Strategic Management Accounting (SMA) has proven its role as a strategic bridge connecting external pressures such as government regulations, investor demands, and professional norms with the organization's internal structure in the form of management control systems (MCS), performance metrics, and managerial incentive mechanisms. This function directly contributes to the implementation of the company's climate strategy within the framework of achieving SDG 13.



The success of this integration is supported by several important factors, including a clear mandate for the sustainability board, climate-oriented leadership (tone at the top), and the implementation of science-based targets through the Science-Based Targets initiative (SBTi). These factors strengthen the integration of climate metrics into strategic planning and operational key performance indicators (KPIs) of the company, while also confirming that corporate governance is the main foundation for implementing a sustainability-based SMA.

The implementation of the Sustainability Balanced Scorecard (SBSC) also makes a significant contribution by helping companies convert climate targets into performance indicators (lead and lag indicators) that can be continuously monitored through a feedback control system. Thus, the SMA functions not only as a performance measurement tool but also as an evaluation instrument in the implementation of decarbonization strategies. Furthermore, the development of environmental budgeting, carbon accounting, and the implementation of internal carbon pricing (ICP) have been proven to encourage energy efficiency and direct capital allocation toward more environmentally friendly investments. The combination of these elements makes the SMA a mechanism capable of linking financial decisions to environmental impacts in a measurable and data-driven manner.

Although transparency in sustainability reporting has improved through frameworks such as the GRI, CDP, and ASRRAT, implementation gaps remain in the internalization of climate indicators into the MCS system and managerial incentive schemes. This situation highlights the need for a more comprehensive and structured SMA, so that reporting practices go beyond formal compliance and can have a real impact on strategic decision-making. Furthermore, the long-term dependence on fossil fuels, the dominant role of state-owned enterprises (SOEs), and fluctuating regulatory dynamics differentiate the Indonesian context from countries with established carbon pricing policies. Therefore, the SMA in Indonesia needs to be contextually adapted to address institutional pressures and strengthen its effectiveness in supporting the implementation of SDG 13.

Overall, the findings of this study underscore that the contribution of Strategic Management Accounting (SMA) to the advancement of SDG 13 hinges on the extent to which SMA is embedded within organizational operations—not merely as a reporting tool, but as an integrated managerial system that infuses sustainability considerations into strategic planning, budgeting procedures, and incentive designs. The results also highlight several practical implications. Companies can activate SMA to drive decarbonization by reinforcing cross-functional data governance, incorporating carbon indicators into rolling forecasts, applying internal carbon pricing within capital budgeting decisions, and broadening SBSC frameworks to capture climate-critical performance measures. At the same time, regulators and accounting professionals can facilitate stronger alignment by elevating governance standards, harmonizing climate-related performance metrics, and encouraging the development of sector-wide guidelines for SMA-based climate control systems.

A key novelty of this study lies in the development of a context-specific conceptual framework that positions SMA as an institutional mediator—one that systematically converts external climate-related pressures into a coherent internal structure of metrics, controls, and incentive mechanisms suited to Indonesia's energy sector. By foregrounding this institutional adaptation, the study

contributes a distinctive viewpoint to the sustainability accounting literature and provides a conceptual platform for subsequent empirical work aimed at validating and refining this model.

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