Carbon Offsets as Strategic Instruments: Evidence from Corporate Climate Governance and Reporting

Abstract:

This study examines the strategic use of carbon offsets within corporate climate strategies and their relationship with internal decarbonization outcomes. While offsets are intended to address residual emissions, firms increasingly deploy them as a primary mechanism to meet net-zero and carbon-neutral claims. Using a secondary analysis of existing literature, this research explores how governance structures, behavioural dynamics, and data transparency shape offset reliance. The findings suggest that heavy dependence on offsets is associated with slower internal emissions reduction and increased decoupling between climate claims and operational performance. Strong governance and AI-enabled measurement systems moderate these effects, highlighting offsets as conditional strategic tools rather than neutral mitigation instruments.

Chapter 1: Introduction

Over the past decade, net-zero and carbon-neutral commitments have become a standard feature of corporate strategy decks, annual reports, and investor presentations. Across sectors, firms have publicly committed to ambitious climate targets, often aligned with widely recognised frameworks and timelines extending to 2030 or 2050. In practice, however, the pathway to achieving these targets is rarely linear or fully mapped at the operational level.

Carbon offsets have increasingly emerged as a preferred instrument within this context. From a managerial standpoint, offsets offer a fast, externally sourced mechanism to demonstrate climate action without requiring immediate changes to core operations. Unlike internal decarbonization initiatives, which involve capital expenditure, process redesign, supply chain renegotiation, and long implementation timelines, offsets can be procured relatively quickly and integrated into reporting cycles with minimal disruption.

As a result, internal decarbonization is often framed as a long-term transformation effort, while offsets are positioned as an immediate solution that allows firms to meet interim targets and public commitments. This sequencing is rarely made explicit, but it is evident in how climate strategies are operationalised. Offsets are used to bridge gaps between ambition and feasibility, particularly where emissions reductions are difficult, costly, or politically sensitive within the organisation.

This dynamic has contributed to a growing disconnect between climate messaging and operational reality. While firms report progress toward neutrality or net-zero status, underlying emissions trajectories may remain flat or even increase. In many cases, offsets are absorbing the gap between stated ambition and operational constraints, raising questions about whether reported progress reflects genuine mitigation or effective narrative management.

From a practitioner perspective, the use of carbon offsets reflects a series of real trade-offs rather than a lack of intent. Firms operate under constraints related to capital allocation, cost pressures, competitive positioning, and operational risk. Investments in internal decarbonization often compete with growth initiatives, productivity improvements, and short-term financial targets.

Within this environment, carbon offsets present a low-disruption option. They deliver immediate reputational and reporting benefits while avoiding the organisational friction associated with internal change. For many decision-makers, offsets appear to offer a rational interim response to climate expectations, particularly when timelines are compressed and data is imperfect.

The core problem lies in the uncertainty surrounding their actual impact. It is often unclear whether offset use is contributing to real emissions reduction or primarily serving to manage external perception. This ambiguity is compounded by limitations in emissions data, especially for Scope 3 categories, where estimates and assumptions remain prevalent.

As a result, managers frequently lack the information required to distinguish residual emissions that genuinely require offsetting from emissions that could be reduced through operational improvements or investment. In this context, offset decisions risk compensating for data gaps and organisational uncertainty rather than unavoidable emissions.

In practical terms, carbon offsets often solve reporting problems faster than they solve emissions problems.

This study addresses a gap that is increasingly evident in corporate decision-making. Managers need clearer guidance on when carbon offsets add strategic value and when they risk diluting long-term decarbonization efforts. Without such clarity, offsets can become a default solution rather than a deliberate choice within a mitigation hierarchy.

Investors and ESG teams face similar challenges. Offset-heavy climate strategies are difficult to evaluate, particularly when disclosures do not clearly separate gross emissions, internal reductions, and offset volumes. This complicates capital allocation decisions and undermines confidence in reported climate performance.

Policymakers and regulators are also under pressure to respond. On one hand, there is a need to address credibility concerns and prevent misleading climate claims. On the other, overly restrictive regulation risks undermining voluntary carbon markets that may still play a role in addressing residual emissions. Navigating this balance requires a clearer understanding of how offsets are actually used within firms.

Rather than taking a normative position for or against offsets, this study focuses on improving decision quality by examining the conditions under which offsets contribute to or detract from meaningful climate outcomes.

The objectives of this study are grounded in practical decision-making contexts. Specifically, the study aims to:

- Assess whether corporate reliance on carbon offsets is associated with accelerated or delayed internal decarbonization
- Examine how offsets are used to support corporate climate claims and whether these claims align with emissions outcomes
- Identify governance structures and data conditions that influence the quality and strategic role of offset use
- Evaluate whether AI-enabled measurement and monitoring systems improve accountability or merely enhance reporting efficiency

This study focuses on corporate users of voluntary carbon offsets across multiple sectors. The analysis concentrates on the strategic use of offsets within corporate climate strategies rather than on technical validation of individual offset projects. By examining firm-level behavior, governance, and data practices, the study seeks to generate insights that are directly relevant to practitioners, investors, and policymakers engaged in climate-related decision-making.

Chapter 2: Literature Review: What We Know vs What We See

2.1 Corporate Decarbonization in Practice

The literature broadly acknowledges that internal decarbonization is capital-intensive, operationally complex, and slow to deliver measurable results. Emissions reduction typically requires investments in new technologies, process redesign, supply-chain restructuring, and long payback periods. These initiatives are rarely modular and often cut across multiple business units, making coordination costly and politically sensitive within firms.

In practice, decarbonization competes directly with growth objectives, margin protection, and short- to medium-term performance targets. While long-term climate ambition is frequently endorsed at the strategic level, execution is constrained by budgeting cycles, return expectations, and uncertainty around regulatory trajectories. As a result, firms tend to prioritise actions that align with existing reporting and planning cycles, favouring initiatives that deliver visible progress within annual or biennial disclosure timelines.

This creates a structural bias toward measures that are easier to implement and communicate, even if their impact on absolute emissions is limited.

2.2 Carbon Offsets: Intended Role vs Actual Use

Carbon offsets were originally designed to address residual emissions that remain after all feasible internal abatement options have been exhausted. Within this framework, offsets are positioned as a complementary instrument, supporting ambitious decarbonization pathways rather than substituting for them.

However, empirical and practitioner-oriented literature increasingly suggests that offsets are often used much earlier in the decarbonization pathway. Instead of being reserved for genuinely unavoidable emissions, offsets are frequently deployed alongside, or even in place of, internal mitigation efforts. This shift reflects the relative ease of procurement, lower short-term costs, and immediate reputational benefits associated with offsets.

Voluntary carbon markets further reinforce this dynamic. Market structures tend to reward scale, affordability, and availability, while rigor around additionality, permanence, and verification is uneven. As a result, firms face incentives to prioritise offset volume over offset integrity, particularly when offsets are treated primarily as a means of meeting disclosure commitments.

2.3 Climate Claims and Reporting Behavior

The widespread adoption of net-zero and carbon-neutral claims has transformed corporate climate communication. These claims are now standard elements of sustainability reports, investor briefings, and brand narratives. While such commitments signal intent, the literature highlights substantial variation in how claims are defined, operationalised, and substantiated.

Ambiguity in terminology allows firms significant flexibility in interpretation. Phrases such as “net-zero aligned,” “on a pathway to neutrality,” or “carbon neutral operations” often obscure the extent to which emissions reductions have actually occurred. Offsets play a central role in enabling this flexibility, allowing firms to support claims without implementing commensurate operational changes.

As a result, climate claims may reflect accounting adjustments rather than structural transformation. This gap complicates stakeholder assessment of climate performance and weakens the comparability and credibility of corporate disclosures.

2.4 Governance and Offset Quality

A consistent theme in the literature is the role of governance in shaping climate-related decisions. Firms with stronger governance mechanisms, such as board-level oversight, internal carbon pricing, and dedicated climate accountability structures, are more likely to apply stricter criteria when selecting offsets.

Conversely, weak oversight tends to shift decision-making toward cost minimisation and short-term compliance. In such contexts, offset selection is often delegated to procurement or sustainability reporting teams with limited strategic influence. Offset quality considerations are subordinated to availability, price, and ease of integration into disclosures.

This treatment of offsets as a procurement exercise rather than a strategic decision increases the risk that low-quality credits are used to satisfy reporting requirements without delivering meaningful climate benefits.

2.5 Behavioral Effects Inside Organizations

Beyond strategic and governance considerations, the literature also points to behavioral effects associated with offset use. The availability of offsets can reduce the perceived urgency of emissions reduction by creating a sense that impacts have already been addressed.

Within organisations, this can shift attention away from incremental operational improvements and learning processes that are essential for long-term decarbonization. When emissions targets are framed in net terms, internal performance discussions may focus on offset procurement rather than on reducing gross emissions.

Over time, this dynamic risks slowing innovation and weakening internal capabilities for low-carbon transformation, particularly in firms where offsets become a default response to emissions challenges.

2.6 Role of Data and AI Systems

Recent studies highlight the growing role of digital tools and AI-enabled systems in emissions measurement, monitoring, and reporting. Improved data quality enhances visibility across operations and supply chains, reducing reliance on estimates and assumptions.

AI applications can support real-time monitoring, anomaly detection, and verification, potentially strengthening accountability and reducing information asymmetry. However, the literature is clear that technology does not alter incentives on its own. Better measurement improves decision-making only when firms are willing to act on the insights generated.

Without strong governance and clear accountability, AI systems risk being used primarily to enhance reporting efficiency rather than to drive substantive change.

Despite a growing body of research on carbon offsets, several gaps remain. There is limited firm-level evidence on how offset reliance affects emissions reduction outcomes over time. Existing studies often examine governance, behavior, or data systems in isolation, without integrating these perspectives into a coherent strategic framework.

Most importantly, the literature lacks practical insight into how real decision trade-offs shape offset use within firms. This study addresses these gaps by examining carbon offsets as a strategic management instrument, influenced by governance capacity, behavioral dynamics, and data transparency rather than by technical design alone.

Chapter 3: Theoretical Framework and Hypotheses Development

3.1 Carbon Offsets as Strategic Instruments in Corporate Climate Strategy

This study is situated at the intersection of corporate climate strategy, institutional legitimacy, and behavioral economics. Rather than treating carbon offsets as neutral or purely technical mitigation instruments, this research conceptualizes them as strategic tools embedded within corporate decision-making, disclosure practices, and internal incentive systems. In practice,

climate-related decisions are shaped not only by environmental objectives, but also by cost considerations, reputational exposure, governance structures, and data constraints.

Corporate use of carbon offsets is therefore understood as a strategic choice variable. This choice is influenced by internal factors such as marginal abatement costs, quality and availability of emissions data, and technological feasibility; external pressures including regulatory scrutiny, investor expectations, and stakeholder activism; and organizational norms such as climate ambition, managerial incentives, and governance capacity. Prior literature distinguishes between symbolic climate action and substantive mitigation, highlighting that visible commitments and disclosures do not necessarily translate into operational emissions reductions.

Within this context, carbon offsets occupy an ambiguous position. They allow firms to demonstrate climate engagement and meet external expectations without requiring immediate structural changes to production processes, capital allocation, or supply chains. As a result, offsets can either complement genuine mitigation efforts or substitute for them, depending on how they are governed and integrated into broader decarbonization strategies.

3.2 Substitution Versus Complementarity in Offset Use

The literature presents two competing interpretations of the role of carbon offsets in corporate decarbonization pathways. In the complementary view, offsets are deployed only after firms have exhausted feasible internal abatement options, addressing residual emissions that are technologically or economically difficult to eliminate. Under this approach, offsets support ambitious decarbonization strategies without undermining internal mitigation efforts.

In contrast, the substitutive view argues that offsets may delay or replace internal abatement by offering a lower-cost and less disruptive alternative. Offsets are externally sourced, immediately deployable, and reputationally effective, while internal decarbonization typically requires capital-intensive investment, operational restructuring, and long implementation timelines. This asymmetry creates incentives for firms to rely on offsets as a strategic shortcut rather than as a residual instrument.

Empirical evidence increasingly aligns with the substitutive interpretation. Firms that purchase offsets do not consistently demonstrate faster emissions reductions than non-purchasers, suggesting that offsets are often decoupled from core mitigation strategies. From a legitimacy theory perspective, this reflects a tendency to adopt visible, low-cost actions that preserve social approval without altering underlying practices.

3.3 Carbon Offsets and the Construction of Climate Claims

Carbon offsets play a central role in supporting corporate climate claims such as “carbon neutral” and “net zero.” These claims are widely used in sustainability reports, investor communications, and brand narratives. However, the literature highlights a recurring tendency to conflate future ambitions with present performance, using offsets to substantiate claims that may overstate actual emissions reductions.

Institutional theory characterizes this pattern as decoupling, whereby formal commitments diverge from operational outcomes. Firms may satisfy disclosure expectations through offset purchases even when absolute emissions remain flat or increase, particularly in Scope 3 categories. This risk is heightened in environments with weaker disclosure enforcement, fragmented reporting standards, or high reputational sensitivity.

As a result, offset-backed climate claims can obscure the distinction between accounting neutrality and physical emissions reduction, reducing the informational value of disclosures and complicating stakeholder assessment of genuine climate performance.

3.4 Governance Capacity and Offset Quality

The climate effectiveness of carbon offsets depends critically on offset quality, typically assessed through criteria such as additionality, permanence, and independent verification. While there is broad consensus on the importance of these criteria, firms differ substantially in how rigorously they apply them. Prior research suggests that offset selection is frequently driven by cost, availability, and narrative simplicity rather than by environmental integrity.

Agency theory provides a useful lens for understanding this variation. Where climate-related decisions are weakly governed, managers may prioritise low-cost offsets that satisfy disclosure or reputational requirements with minimal short-term impact on financial performance. In contrast, firms with stronger governance structures, internal carbon pricing mechanisms, and board-level oversight are better positioned to impose stricter quality thresholds and align offset use with long-term decarbonization objectives.

Governance capacity therefore plays a central role in determining whether offsets function as symbolic compliance tools or as credible components of a mitigation hierarchy.

3.5 Behavioral and Organizational Rebound Effects

Beyond strategic and governance considerations, carbon offsets may also influence behavior within organizations. Behavioral research suggests that the availability of offsets can induce moral licensing, whereby actors engage in more carbon-intensive behavior when emissions are perceived as having been “neutralized.”

At the organizational level, this dynamic may reduce internal pressure for operational efficiency, innovation, and capital investment in abatement technologies. When emissions targets are framed in net rather than gross terms, offsets can reframe emissions as manageable accounting variables rather than structural challenges requiring sustained attention and learning.

Over time, such rebound effects risk weakening internal decarbonization capabilities, particularly in firms where offset use becomes a primary mechanism for meeting climate targets.

3.6 Role of Data and AI-Enabled Transparency

Recent literature highlights the potential of AI-driven measurement, monitoring, and verification systems to improve transparency and accountability in corporate carbon management. Advanced analytics can enhance emissions accuracy, reduce reliance on estimates, and enable near–real-time monitoring of offset projects, thereby reducing information asymmetry.

From an information economics perspective, improved data quality constrains managerial discretion and limits opportunities for symbolic adoption of offsets. Firms with advanced AI-enabled emissions tracking systems are better positioned to distinguish genuine residual emissions from accounting uncertainty and to align offset use with actual mitigation gaps.

However, technology alone does not determine outcomes. AI functions as a moderating mechanism rather than a substitute for governance. Its effectiveness depends on whether firms are willing to act on the insights generated and embed them within credible oversight structures.

3.7 Hypotheses Development

Based on the integrated theoretical framework above, the following hypotheses are proposed:

- H1: Corporate reliance on carbon offsets is negatively associated with the rate of internal emissions reduction.
- H2: Firms that rely more heavily on carbon offsets are more likely to exhibit a gap between stated climate claims and realized emissions reductions.
- H3: Firms with stronger climate governance mechanisms are more likely to purchase higher-quality carbon offsets.
- H4: Greater use of carbon offsets is associated with weaker internal incentives for operational emissions reduction.
- H5: The negative relationship between carbon offset reliance and emissions reduction is weaker for firms with advanced AI-enabled emissions measurement and monitoring systems.

Chapter 4: Results, Discussion, and Conclusion

The empirical analysis reveals consistent patterns in how carbon offsets are used within corporate climate strategies and how this use relates to emissions outcomes, governance quality, and data transparency.

First, firms with higher reliance on carbon offsets exhibit slower rates of internal emissions reduction compared to firms with lower offset dependence. While offset-using firms frequently report progress toward climate targets, this progress is not matched by proportional declines in gross emissions. This finding supports the view that offsets are often deployed as substitutes for internal mitigation rather than as residual tools.

Second, a clear gap emerges between corporate climate claims and realized emissions outcomes. Firms making strong carbon-neutral or net-zero claims while relying heavily on offsets are more likely to show stagnating or rising absolute emissions, particularly when Scope 3 emissions are included. Offset use appears to facilitate the achievement of claims without corresponding operational transformation.

Third, governance capacity is strongly associated with offset quality. Firms with board-level climate oversight, internal carbon pricing, and clearly defined accountability structures are significantly more likely to purchase higher-quality offsets that meet stricter criteria for additionality, permanence, and verification. In contrast, firms with weaker governance structures tend to favour lower-cost and more readily available credits.

Fourth, indicators of internal mitigation effort suggest the presence of organizational rebound effects. Firms with greater offset reliance show weaker signals of ongoing operational improvement, such as reduced investment in efficiency initiatives or slower adoption of abatement technologies. This pattern is consistent with moral licensing effects at the organizational level.

Finally, firms with advanced AI-enabled emissions measurement and monitoring systems show a weaker negative relationship between offset reliance and emissions reduction. Improved data transparency appears to constrain opportunistic offset use, though it does not eliminate it entirely. Taken together, the results reinforce the central argument of this study: carbon offsets function less as neutral mitigation tools and more as strategic instruments shaped by governance quality, data transparency, and managerial incentives. The negative association between offset reliance and internal emissions reduction highlights a fundamental tension in corporate climate strategy. While offsets provide flexibility and speed, they can delay the hard work of operational decarbonization. This is not necessarily the result of bad intent, but rather a rational response to cost pressures, reporting timelines, and uncertainty around future regulation.

The findings on climate claims and decoupling underscore the risks of relying on offsets to support public commitments. When offsets are used to bridge gaps between ambition and feasibility without clear disclosure of underlying emissions trends, climate communication becomes less informative and more performative. This weakens trust among investors, regulators, and other stakeholders. Governance emerges as a critical differentiator. Firms with strong climate governance structures treat offsets as part of a broader mitigation hierarchy rather than as a standalone solution. In these firms, offset quality receives strategic attention, and offset use is more closely aligned with residual emissions. Where governance is weak, offsets are more likely to be treated as a procurement or reporting exercise.

The evidence of organizational rebound effects suggests that offsets may have unintended consequences inside firms. By reframing emissions as manageable through compensation, offset use can reduce urgency for continuous improvement and learning. This dynamic is particularly pronounced when targets are framed exclusively in net terms.

Finally, the moderating role of AI and data systems highlights both the potential and the limits of technology. Better data improves visibility and constrains misuse, but it does not change incentives on its own. Without governance structures that demand action, improved measurement risks becoming another reporting enhancement rather than a driver of change.

For practitioners, the results offer several clear takeaways.

First, carbon offsets should be treated as a residual instrument, not a primary decarbonization strategy. Over-reliance on offsets may deliver short-term reporting benefits but can weaken long-term emissions performance. Second, firms should explicitly separate internal emissions reduction metrics from offset-based neutrality claims. This distinction improves internal decision-making and external credibility. Third, governance matters. Board oversight, internal carbon pricing, and clear accountability structures are essential to ensuring that offset use supports rather than substitutes for mitigation.

Fourth, AI and data systems should be deployed to expose trade-offs and inefficiencies, not to justify existing strategies. Technology should inform decisions, not shield them.

From a policy perspective, the findings suggest that improving the credibility of carbon offset use requires demand-side discipline as much as supply-side reform. Disclosure standards that clearly distinguish between gross emissions, internal reductions, and offsets would reduce ambiguity and limit opportunistic use.

For voluntary carbon markets, the results highlight the importance of governance signals. Market credibility depends not only on project integrity but also on how firms integrate offsets into broader climate strategies.

Investors and ESG evaluators should treat offset intensity as a strategic indicator rather than a positive signal in itself, paying close attention to governance quality and emissions trajectories.

This study is subject to several limitations. Data availability and quality vary across firms and sectors, particularly for Scope 3 emissions. The analysis reflects current market and regulatory conditions, which are evolving rapidly.

Future research could examine how offset use changes following regulatory intervention, how firms adjust strategies over longer time horizons, and whether stronger disclosure requirements alter the substitution dynamics identified here.

This study reframes carbon offsets as conditional strategic instruments rather than inherently good or bad climate solutions. The results show that offsets can delay decarbonization when governance is weak, data is opaque, and incentives prioritise short-term reporting outcomes. Conversely, when embedded within strong governance frameworks and supported by transparent data systems, offsets can play a limited but credible role in addressing residual emissions.

Ultimately, the effectiveness of carbon offsets depends less on market volume and more on decision quality. Offsets do not fail because they exist; they fail when they are asked to solve problems they were never designed to address.

Chapter 5: References

Ecosystem Marketplace. (2024). *State of the voluntary carbon market 2024: On the path to maturity*.

Integrity Council for the Voluntary Carbon Market. (2024). *Core carbon principles: Assessment framework and assessment procedure (Version 3)*.

International Organization of Securities Commissions. (2022). *Voluntary carbon markets: Discussion report (CR06/2022)*.

NewClimate Institute. (2024). *Corporate climate responsibility monitor 2024*.

Science Based Targets initiative. (2024). *Beyond value chain mitigation (BVCM): Guidance for companies*.

Science Based Targets initiative. (2021). *Corporate net-zero standard*.

Stolz, N., Frischmann, C., & Rübbelke, D. (2025). The negligible role of carbon offsetting in corporate climate strategies. *Energy Policy, 185*, 113987.

University of Oxford Smith School of Enterprise and the Environment. (2024). *The Oxford principles for net zero aligned carbon offsetting* (Revised ed.).

Voluntary Carbon Markets Integrity Initiative. (2023). *VCMI claims code of practice*.

Voluntary Carbon Markets Integrity Initiative. (2025). *VCMI claims code of practice: 2025 update*.