SCERM© WHITEPAPER

Supply Chain Emission Reduction Method

Turning Voluntary Climate Action into Compliance Value

A Kyoto Network Research Publication on Supply-Chain Decarbonisation, Traceability, and Market Alignment.

"The bridge between impact and integrity."

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“Research belongs to those who act upon it.”

Author Profiles

Sheraz Malik is the Founder and Chief Executive Officer of Kyoto Network, a sustainability and supply-chain transformation firm focused on real-economy decarbonisation, project development, and climate data integrity.

He has over a decade of experience working across the full lifecycle of sustainability and climate initiatives, from early-stage design and stakeholder alignment through to implementation, monitoring, and verification. His work spans nature-based solutions, clean energy systems, industrial decarbonisation, and complex supply-chain interventions across Europe, Africa, and emerging markets.

Under his leadership, Kyoto Network has developed and supported a multi-billion-dollar global project pipeline, working with corporates, investors, and public-sector counterparts on programmes operating at national, regional, and landscape scale, including engagement with governments and public agencies on policy-aligned project development and climate finance structures.

Sheraz's perspective is grounded in execution and systems integration. His direct experience of delivering projects and aligning outcomes with corporate disclosures, investor expectations, and public-sector frameworks has shaped the development of the Supply Chain Emissions Reduction Method (SCERM©) and its emphasis on attribution, verification, and disclosure usability.

Sonali Tamaskar is Head of Research and Development at Kyoto Network, where she leads the technical design and governance framework underpinning the Supply Chain Emission Reduction Method (SCERM©).

With a professional background in financial compliance, risk management, and audit-readiness, her work focuses on ensuring that SCERM© is built to meet the standards of rigour expected in regulated and financial environments. Her experience across banking operations, regulatory reporting, and internal controls informs the method's emphasis on data integrity, traceability, and verification.

At Kyoto Network, she has overseen the research and methodological development of the SCERM© framework and whitepaper, supporting its alignment with established global standards including the GHG Protocol, ISO 14064, and leading disclosure frameworks such as GRI, ESRS, IFRS S1/S2, SBTi, and CDP.

She continues to steward the technical evolution of SCERM©, with a focus on assurance readiness, interoperability with emerging standards, and the integration of environmental and social performance into credible supply-chain climate strategies.

Executive Summary

The Supply Chain Emissions Reduction Method (SCERM©) is a research-based methodology developed by Kyoto Network to enable organizations to convert real supply-chain interventions into measurable, verifiable, and disclosure-grade outcomes.

In an era where over 75 percent of corporate greenhouse-gas emissions occur within value chains (MIT Sloan, 2025), traditional sustainability and carbon-accounting approaches remain structurally incomplete. While most companies can measure and report emissions, far fewer can evidence credible reductions occurring upstream in sourcing, land use, energy systems, or supplier operations. As a result, significant sustainability investment fails to translate into robust Scope 3 disclosures, transition plans, or decision-useful data for investors and regulators.

SCERM© addresses this gap by establishing a transparent, traceable, and auditable process for quantifying and attributing outcomes that occur inside a company's value chain. It enables organizations to associate verified project outcomes—such as regenerative agriculture, landscape restoration, clean energy substitution, or industrial decarbonisation—with their procurement activities and supplier networks, provided those outcomes meet SCERM© eligibility criteria and are data-linked, MRV-verified, and independently assured.

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1. Purpose, Scope, and Intended Audience

1.1 Purpose of This Whitepaper

This whitepaper sets out the Supply Chain Emissions Reduction Method (SCERM©)—a research-based methodology developed by Kyoto Network to address persistent gaps in the way Scope 3 emissions and supply-chain interventions are measured, attributed, and used within corporate decision-making.

Its purpose is not to introduce a new market instrument or policy proposal, but to provide a methodological framework that enables real-world supply-chain action to generate attributable, verifiable, and disclosure-grade outcomes. The paper responds to a growing disconnect between increasing corporate investment in upstream climate and sustainability interventions and the limited ability of existing systems to translate that action into credible corporate disclosures, transition plans, and risk assessments.

1.2 Scope of the Paper

This publication focuses on methodology, not advocacy.

Specifically, it addresses:

- How supply-chain interventions can be screened, attributed, verified, and structured for corporate use
- Why Scope 3 emissions remain structurally unresolved despite increased capital deployment
- How evidence can be generated once and reused across multiple disclosure and reporting contexts

The paper does **not**:

- Propose regulatory changes
- Create or promote a trading system, offset mechanism, or compliance instrument

- Provide legal, financial, or investment advice

SCERM© is presented as a discipline for structuring evidence, designed to operate alongside existing corporate reporting, assurance, and governance systems.

1.3 Intended Audience

This whitepaper is written for decision-makers and practitioners engaged with supply-chain emissions, sustainability governance, and transition risk, including:

- **Corporate leaders and teams** responsible for Scope 3 reporting, procurement, sustainability strategy, and transition planning
- **Investors and lenders** assessing transition risk, disclosure quality, and the credibility of corporate climate strategies
- **Auditors and assurance providers** evaluating the robustness, traceability, and consistency of non-financial data
- **Policymakers and standard-setters** examining the practical limits of current Scope 3 approaches and the role of attribution and verification

While the paper is technical in nature, it is intended to support practical decisions, not academic debate alone.

1.4 Decisions This Paper Supports

The SCERM© methodology is designed to support informed decision-making in areas including:

- Scope 3 disclosure readiness and audit resilience
- Transition planning and forward-looking climate strategy
- Allocation of sustainability and transition capital
- Supplier engagement and supply-chain risk management

- Investor and lender assessment of transition credibility

Readers are encouraged to approach the paper not as a theoretical model, but as a toolkit for improving the quality and usability of evidence underpinning supply-chain climate action.

The sections that follow set out the rationale, structure, and application of SCERM©, beginning with an overview of its objectives and strategic relevance.

1.5 Key Objectives of SCERM©

Bridge the Divide

Create a credible link between on-the-ground supply-chain interventions and corporate disclosure, transition planning, and risk management.

Enable Recognition

Allow companies to integrate verified, supply-chain-linked outcomes into Scope 3 reporting and sustainability disclosures across leading global frameworks.

Strengthen Trust

Apply consistent measurement, reporting, and verification (MRV) practices, supported by transparent data architecture and traceability.

Promote Integrity

Ensure that recognised outcomes are auditable, non-duplicated, and aligned with globally accepted accounting and disclosure principles.

Advance Resilience

Incentivise real supply-chain transformation by linking sustainability action to procurement decisions, supplier engagement, and long-term value creation.

Direct Capital Toward Impact

Channel climate and transition capital into eligible supply-chain programmes where outcomes are measurable, attributable, and strategically relevant.

1.6 Illustrative Case Studies

Table 1.6: *Illustrative Applications of the SCERM© Method Across Supply-Chain Contexts*

Project	Region	Emission / Risk Source Addressed	Illustration of SCERM© Principle
The Great Gum Belt (Sudan)	East Africa	Land-use change, deforestation, livelihoods	Landscape restoration embedded within gum-arabic supply chains, generating attributable Scope 3 and nature-related outcomes.
KyoGreen Clean Energy Systems (Kenya & Zanzibar)	East Africa	Methane emissions, fossil-fuel dependency	Clean energy substitution reducing emissions and social risk within supplier and community energy systems.
Carbon Capture & Utilisation Programme (UK)	Europe	Industrial process emissions	Capture and reuse of biogenic CO_2 within beverage and logistics supply chains, supporting transition and disclosure objectives.

Table 1.6 *illustrative examples of how SCERM© operates in practice across different geographies and supply-chain challenges.*

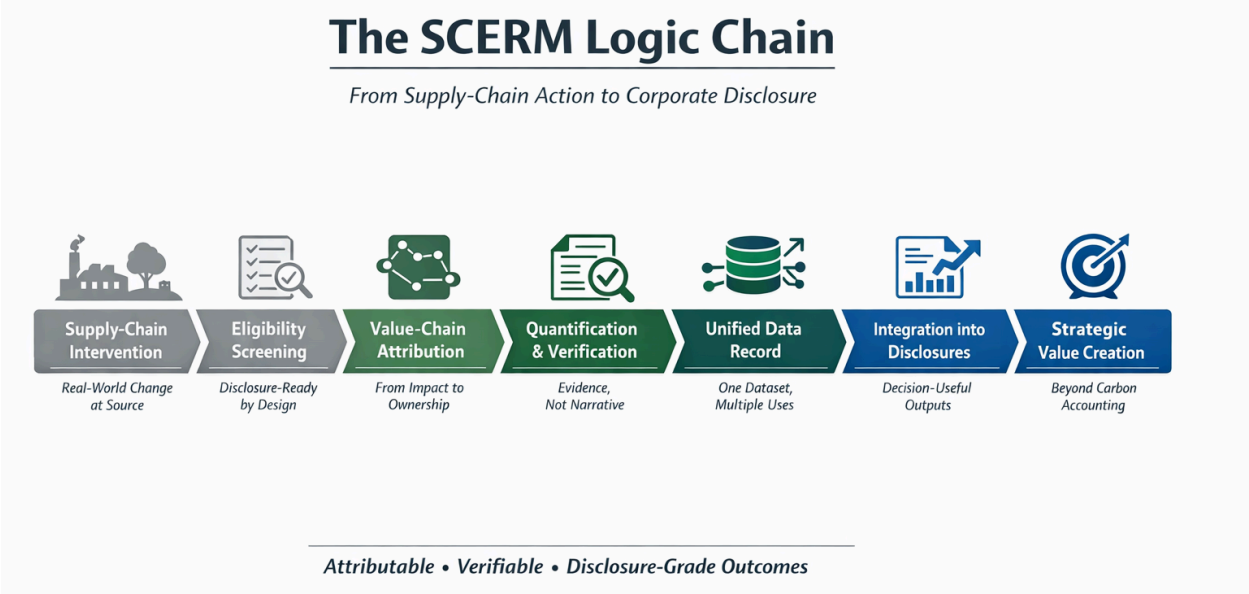
1.7 Strategic Relevance

By aligning verified field data with corporate value-chain attribution, SCERM© provides a structured link between real-world impact and disclosure integrity—allowing sustainability action to translate into defensible Scope 3 reporting, transition planning, and risk disclosure.

The methodology anticipates global shifts toward mandatory supply-chain transparency, including enhanced Scope 3 scrutiny under corporate reporting, investor frameworks, and sustainability standards. SCERM© does not function as a trading system or compliance

substitute; instead, it addresses the underlying supply-chain drivers that shape long-term emissions exposure, resilience, and competitiveness.

SCERM© is not an offset mechanism. It is a disclosure-led method that integrates in-chain outcomes into corporate reporting structures—creating a foundation for consistent supply-chain emissions reduction and ensuring capital flows to interventions that deliver measurable, real-economy results.



(*Figure 1, The SCERM© Logic Chain)*

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2. The Context: Why Scope 3 Is Still Unsolved

2.1 The Quantitative Problem

Approximately 75 percent of total corporate greenhouse-gas emissions occur within value chains, yet fewer than 20 percent of companies possess auditable, supplier-level emissions data (MIT Sloan, 2025; CDP, 2025).

This imbalance creates a structural problem. While corporate climate ambition and capital mobilisation have increased rapidly, the evidentiary quality of Scope 3 data has not kept pace. As a result, a large share of sustainability expenditure fails to translate into disclosure-grade information that can support transition planning, risk management, or investor scrutiny.

Table 2.1: Scope 3 Emissions, Data Coverage, and Climate Capital Allocation (2025)

Metric (2025)	Global Estimate	Source
Share of Scope 3 in total corporate footprint	≈ 75 %	MIT Sloan (2025)
Firms with supplier-verified emission data	< 20 %	CDP (2025)
Corporate capital allocated to voluntary climate programmes (2024–25)	~ USD 210 bn	WEF (2025)
Portion generating disclosure-grade, attributable data	< 15 %	Kyoto Network analysis (2025)

Table 2.1 summarises indicative global metrics highlighting the scale of Scope 3 emissions, current limitations in supplier-level data coverage, and the gap between climate-related capital deployment and the availability of disclosure-grade, attributable data.

Interpretation:
An estimated USD 180–190 billion per year in climate-related expenditure produces limited value for corporate disclosures and transition decision-making—not due to lack of impact, but due to weak attribution, inconsistent verification, and poor integration with corporate reporting systems.

2.2 The "Double-Effort" Trap

Current sustainability architectures treat supply-chain interventions and corporate disclosure requirements as separate domains.

As a result, companies are required to manage the same Scope 3 risks through parallel processes, each governed by different data structures, assurance expectations, and internal ownership:

Table 2.3: Parallel Processes in Supply-Chain Interventions and Corporate Disclosure

Activity	Intervention Track	Disclosure & Risk Track	Resulting Inefficiency
Measurement & verification	Project-level MRV	Audit & assurance for reporting	Duplicate data work, limited reuse
Data management	ESG platforms and dashboards	Finance, risk, and reporting systems	Fragmented datasets, reconciliation burden
Capital allocation	Sustainability or impact budgets	Transition, procurement, and risk budgets	Disconnected spend and diluted value

Table 2.3 illustrates how supply-chain interventions and corporate disclosure requirements are commonly managed through parallel processes, resulting in duplicated effort, fragmented data, and reduced strategic value.

This is not double counting of emissions.
It is **double effort**: two sets of systems, controls, and teams applied to the same underlying supply-chain reality.

The consequence is a **capital-inefficient transition model**, in which substantial sustainability investment fails to influence procurement decisions, transition strategies, or financial risk assessment.

2.4 The Economic Inefficiency

Let:

- $\mathbf{C_v}$ = cost of implementing supply-chain interventions
- $\mathbf{C_r}$ = cost of translating outcomes into disclosure-grade data
- $\mathbf{V_r}$ = decision-useful value derived from recognised outcomes

Without methodological integration:

$$\text{Effective ROI} = \frac{V_r}{C_v + C_r}$$

Where intervention and disclosure operate as separate processes, the cost of reconciliation and assurance materially reduces effective value.

With SCERM© (single-path method):

$$\text{Effective ROI} = \frac{V_r}{C_v}$$

By embedding attribution, verification, and disclosure structure into the intervention itself, SCERM© eliminates the need for duplicated data translation and parallel assurance processes.

In practical terms, organisations investing tens of millions of dollars annually in supply-chain programmes can materially improve the efficiency, usability, and credibility of that spend—without increasing intervention costs.

2.5 The Structural Disconnect

The persistence of Scope 3 failure is not caused by lack of standards or ambition, but by structural misalignment:

- **Regulatory and Reporting Focus**
  Corporate reporting regimes increasingly demand Scope 3 transparency, yet data collection remains detached from how supply chains actually operate.

- **Project-Level Isolation**
  Many interventions are verified in isolation, without mechanisms to link outcomes to suppliers, commodities, or procurement flows.

- **Attribution Granularity**
  Scope 3 categories are often too aggregated to support defensible ownership or proportional allocation of outcomes.

SCERM© resolves this disconnect by embedding eligibility screening, attribution logic, MRV, and disclosure structure into a single methodological pathway, producing one coherent dataset suitable for multiple corporate uses.

2.6 Infographic Reference – "The SCERM© Logic Chain"

The SCERM© Logic Chain *(See Figure 1)* illustrates how supply-chain interventions progress from physical implementation to disclosure-grade outcomes through eligibility screening, attribution, verification, and unified data integration.

2.7 Key Message

The challenge of Scope 3 is not the absence of capital, intent, or projects.
It is the inefficient conversion of real-world action into usable corporate evidence.

By aligning supply-chain interventions with attribution, verification, and disclosure requirements from the outset, SCERM© enables organisations to convert sustainability investment into measurable, reportable, and strategically relevant outcomes—without relying on offsets, registries, or compliance substitution.

2.8 Implications for Corporates

The unresolved nature of Scope 3 is no longer a technical problem; it is an operational and governance challenge with direct implications for finance, risk, and strategy.

For corporates, the current state of Scope 3 management creates four material consequences:

A. Disclosure Risk
As mandatory reporting frameworks expand, organisations face increasing exposure to incomplete, inconsistent, or weakly evidenced Scope 3 disclosures. This elevates audit scrutiny, increases the cost of assurance, and heightens the risk of restatement or qualification.

B. Transition Credibility Gap
Many transition plans rely on high-level assumptions about supplier engagement or future decarbonisation pathways. Without attributable, verifiable supply-chain evidence, these plans remain vulnerable to challenge by investors, regulators, and internal risk committees.

C. Capital Inefficiency
Sustainability and transition budgets are frequently deployed without a clear mechanism for reuse across procurement, reporting, and risk management. This fragmentation reduces return on investment and limits the strategic impact of climate-related spend.

D. Procurement and Supply-Chain Exposure
Lack of visibility into upstream emissions, land-use change, and social risk constrains procurement decision-making and weakens supply-chain resilience—particularly in high-risk geographies and commodities.

SCERM© addresses these implications not by adding new reporting layers, but by restructuring how evidence is generated. By embedding eligibility screening, attribution logic, and verification requirements into supply-chain interventions from the outset, SCERM© enables organisations to:

- Improve the quality and defensibility of Scope 3 disclosures
- Strengthen transition plans with evidence-based supply-chain data
- Reduce duplication between sustainability, finance, and risk functions
- Direct capital toward interventions that deliver measurable strategic value

In this context, SCERM© functions as an enabling mechanism—aligning real-world supply-chain action with the evidentiary standards required for credible corporate reporting, risk management, and long-term value creation.

2.9 Implications for Investors and Lenders

For investors and lenders, Scope 3 emissions are no longer a peripheral ESG concern; they represent a material source of transition risk, valuation uncertainty, and capital misallocation.

The current limitations of Scope 3 data create four structural challenges for capital providers:

A. Incomplete Risk Pricing
Where Scope 3 exposure is estimated using high-level assumptions or proxy data, investors are unable to accurately price transition risk, supply-chain disruption, or regulatory exposure. This results in mispriced assets and under-appreciated downside risk—particularly in sectors dependent on land use, energy-intensive inputs, or complex global sourcing.

B. Weak Signal-to-Noise Ratio in ESG Data
A growing volume of sustainability disclosures does not necessarily translate into higher decision quality. Without attributable and verifiable supply-chain evidence, ESG metrics risk becoming narrative-driven, limiting their usefulness for credit assessment, portfolio construction, and stewardship activities.

C. Limited Confidence in Transition Claims
Capital providers are increasingly asked to evaluate transition plans, sustainability-linked finance structures, and performance-based incentives. In the absence of robust Scope 3 attribution and verification, it remains difficult to distinguish between credible transition strategies and aspirational commitments.

D. Inefficient Deployment of Transition Capital
Significant pools of capital are now earmarked for climate and transition finance, yet weak linkage between capital deployment and measurable supply-chain outcomes reduces confidence that funding is driving real emissions reduction or risk mitigation.

By enabling attributable, disclosure-grade evidence from supply-chain interventions, SCERM© improves the quality of information available to capital providers. This supports:

- More accurate **assessment of transition and supply-chain risk**
- Greater confidence in **corporate transition plans and use-of-proceeds claims**
- Improved alignment between **capital deployment and real-economy outcomes**
- Enhanced monitoring of performance-linked finance over time

For investors and lenders, SCERM does not create new claims or instruments.
It improves the evidentiary foundation on which capital allocation, risk pricing, and stewardship decisions are made.

In this sense, SCERM© functions as a risk-clarification mechanism—reducing uncertainty around Scope 3 exposure and enabling capital to flow more efficiently toward companies and interventions demonstrating credible, verifiable progress.

3. The SCERM© Methodology

SCERM© is a single-path methodological framework designed to convert supply-chain interventions into attributable, verifiable, and disclosure-grade outcomes.
The method is structured to eliminate duplicated processes by embedding eligibility, attribution, verification, and disclosure logic into one coherent sequence.

The methodology consists of five sequential stages.

3.1 Eligibility Gate

All interventions enter SCERM© through a formal eligibility gate.

At this stage, projects are assessed against SCERM© eligibility criteria to confirm that outcomes are capable of being:

- Linked to a corporate value chain
- Measured and monitored over time
- Attributed using transparent allocation logic
- Independently verified
- Used within corporate disclosures and transition planning

Projects that fail to meet eligibility requirements do not proceed further under the method.

The eligibility gate ensures that only disclosure-capable interventions generate SCERM©-recognised outcomes.

3.2 Value-Chain Mapping and Attribution

For eligible projects, SCERM© establishes a value-chain attribution model.

This involves:

- Identifying relevant suppliers, commodities, regions, or production stages
- Defining the relationship between project outcomes and procurement exposure
- Applying proportionate allocation rules (e.g. volume-based, contractual, geographic, or risk-weighted)

Attribution is performed at a level of granularity sufficient to support:

- Scope 3 category mapping
- Supplier or commodity-level disclosures
- Transition plan assumptions

This step converts project-level impact into corporate-relevant ownership logic.

3.3 Quantification and Monitoring

Attributed outcomes are quantified using:

- Recognised methodologies where available
- Justified, documented approaches where sector-specific methods are required

Quantification covers emissions reductions and, where relevant, nature and social indicators material to supply-chain risk.

Monitoring is conducted over defined reporting periods, ensuring outcomes remain:

- Consistent
- Traceable
- Comparable over time

This stage establishes the numerical foundation of SCERM© outputs.

3.4 Verification and Assurance

Quantified outcomes are subject to independent verification or assurance, appropriate to their intended use.

Verification focuses on:

- Methodological consistency
- Data accuracy and completeness
- Attribution logic and allocation rules
  Integrity and non-duplication

Assurance may be performed at:

- Project level
- Programme level
- Portfolio level

This step ensures SCERM© outputs meet the evidentiary standards expected for corporate reporting, audit, and investor scrutiny.

3.5 Unified Data Record

Verified outcomes are consolidated into a **single structured data record**.

The unified record combines:

- Intervention details
- Attribution logic
- Quantified outcomes
- Verification status

This dataset is designed for reuse across:

- Sustainability reporting
- Transition planning
- Risk management
- Internal decision-making

By maintaining one authoritative record, SCERM© avoids parallel datasets and reduces reconciliation effort across functions.

3.6 Disclosure Mapping and Use

SCERM© outputs are mapped into relevant corporate disclosure frameworks and internal processes, including:

- Scope 3 emissions reporting
- Transition plans and forward-looking targets
- Sustainability and risk disclosures
- Investor and lender information requirements

The same verified dataset can be reused across multiple disclosure contexts without reinterpretation or re-verification.

This final step converts SCERM© outputs into decision-useful corporate information.

3.7 Methodological Outcome

Through this sequence, SCERM© delivers:

- Attributable supply-chain outcomes
- Verification-grade evidence
- Disclosure-ready data
- Reduced duplication across sustainability, finance, and risk functions

SCERM© does not create new instruments or claims.
It restructures how evidence is generated so that real-world supply-chain action produces durable corporate value.

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4. SCERM© Framework Cross-Mapping

Table 4.1: Alignment of the SCERM© Method with Major Corporate Disclosure Frameworks

SCERM© Method Stage	GRI	ESRS (CSRD)	IFRS S1 / S2	SBTi FLAG	CDP
Eligibility Gate	GRI 204, 308, 414	E1, E4, S2, S3	S1 (material risks)	FLAG boundary setting	CDP governance
Value-Chain Attribution	GRI 308, 414	E1, E4	S2 (Scope 3 metrics)	FLAG value-chain allocation	CDP Scope 3
Quantification & Monitoring	GRI 305, 304	E1 metrics	S2 metrics & targets	FLAG emissions accounting	CDP Climate
Verification & Assurance	GRI assurance	ESRS assurance	S1 assurance	FLAG data quality	CDP verification
Unified Data Record	Multi-GRI reuse	CSRD data reuse	Financial linkage	FLAG reporting	CDP reuse
Disclosure Mapping	Sustainability report	CSRD filing	Investor disclosures	FLAG reporting	CDP submission

Table 4.1 illustrates how the stages of the SCERM© methodology align with key global sustainability and disclosure frameworks, showing how a single, structured dataset can support multiple reporting and disclosure requirements.

Interpretation:
SCERM© does not introduce parallel reporting.
It structures evidence so that **a single verified dataset can populate multiple mandatory and voluntary disclosures**.

Table 4.2: Illustrative Coverage of Scope 3 Categories Under the SCERM© Method

Scope 3 Category	SCERM© Contribution
Purchased Goods & Services	Supplier-linked interventions, land-use and energy attribution
Fuel- & Energy-Related Activities	Energy substitution, efficiency, and fuel switching
Upstream Transportation & Distribution	Logistics-linked emissions reduction
Waste Generated in Operations	Circularity and processing interventions
Use of Sold Products	Where product-use attribution is defensible
End-of-Life Treatment	Material recovery and circular interventions

Table 4.2 provides indicative examples of how SCERM© may contribute to different Scope 3 categories where value-chain linkage and attribution are defensible. ***Note:*** *SCERM© applies only where attribution logic is defensible.*
Coverage is ***category-specific****, not universal by default.*

Table 4.3: Relationship Between SCERM© and Double Materiality Under ESRS

Materiality Dimension	SCERM© Contribution
Impact Materiality	Quantified impacts on climate, land, biodiversity, and communities
Financial Materiality	Evidence of transition risk, supply disruption, and exposure
Forward-Looking	Transition pathway support through attributable outcomes
Audit Readiness	Verified, traceable, and reusable datasets

Table 4.3 illustrates how SCERM© supports both impact and financial materiality considerations under the ESRS framework through structured, attributable, and verifiable supply-chain evidence.

Table 4.4: Comparison Between Traditional Insetting Approaches and the SCERM© Method

Dimension	Traditional Insetting	SCERM©
Nature	Claim / positioning	Methodology
Evidence Structure	Project-specific	Standardised, reusable
Attribution Rules	Often implicit	Explicit and documented
Audit Readiness	Variable	Designed-in
Disclosure Reuse	Limited	Multi-framework

Table 4.4 provides a high-level comparison between traditional insetting approaches and SCERM©, highlighting differences in structure, attribution, and disclosure usability.

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5. Governance and Controls

5.1 Governance and Controls

SCERM© is governed as a methodological system, not a project registry or crediting scheme. Governance focuses on data integrity, attribution discipline, and disclosure credibility.

5.1.1 Method Governance

SCERM© governance includes:

- Defined eligibility criteria and exclusion rules
  Standardised attribution principles
- Documented quantification and allocation methodologies
- Version control over methodological updates

Method updates are applied prospectively and do not retroactively alter verified outcomes.

5.1.2 Data Ownership and Use Controls

For each SCERM©-recognised outcome:

- Ownership and permitted use are defined at inception
- Disclosure use, transition planning use, and performance communication are distinguished
- Incompatible claims are explicitly restricted

This prevents duplication, misrepresentation, and conflicting disclosures.

5.1.3 Verification and Assurance Oversight

Verification processes are governed to ensure:

- Independence of assurance providers
- Consistency of methodology application

- Traceability of data inputs and allocation logic

Assurance scope is aligned with intended use, including:

- Corporate reporting
- Investor disclosures
- Transition planning documentation

5.1.4 Internal Controls and Audit Readiness

SCERM© is designed to integrate with corporate internal control environments by:

- Producing structured, auditable data records
- Maintaining documentation suitable for internal audit review
- Supporting reconciliation between sustainability, finance, and risk functions

This enables organisations to treat SCERM© outputs as decision-grade information, not narrative ESG data.

5.1.5 Governance Outcome

Through formal governance and controls, SCERM© ensures that:

- Outcomes remain attributable and verifiable over time
- Disclosures are consistent and defensible
- Transition claims are evidence-based
- Sustainability investment withstands audit and investor scrutiny

6. Use Cases

SCERM© is designed to be applied across multiple organisational contexts where Scope 3 emissions, supply-chain risk, and disclosure requirements intersect.
The following use cases illustrate how the methodology operates in practice without changing its underlying structure.

6.1 Corporate Use Case: Procurement, Scope 3, and CSRD Readiness

Context

A multinational company with material Scope 3 exposure through agricultural sourcing, energy-intensive inputs, or complex supplier networks faces increasing disclosure obligations under CSRD, ESRS, and investor scrutiny.

Challenge

- Limited supplier-level emissions data
- Reliance on estimates and averages
- Sustainability programmes disconnected from procurement decisions
- High audit friction and disclosure risk

SCERM© Application

- Eligible supply-chain interventions are identified within sourcing regions or supplier operations
- Outcomes are attributed to procurement volumes or supplier categories
- Quantified and verified data is consolidated into a unified SCERM© record
- Outputs are mapped directly into Scope 3 reporting and ESRS disclosures

Outcome

- Improved quality and defensibility of Scope 3 disclosures
- Reduced reliance on proxy data
- Clear linkage between sustainability action and procurement strategy
- Lower audit and assurance burden

6.2 Corporate Use Case: Transition Planning and Risk Management

Context
A company is required to publish a transition plan under IFRS S1/S2 or investor expectations, addressing long-term climate and nature-related risks embedded in its value chain.

Challenge

- Transition plans based on assumptions rather than evidence
- Limited visibility into upstream mitigation progress
- Difficulty demonstrating execution credibility

SCERM© Application

- Supply-chain interventions are screened for eligibility and attribution
- Outcomes are integrated into transition pathways as evidence-based actions
- Verified results support forward-looking assumptions and milestones

Outcome

- Transition plans grounded in attributable, real-world action
- Improved credibility with investors, lenders, and regulators
- Clear linkage between capital deployment and risk reduction

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6.3 Investor and Lender Use Case: Due Diligence and Capital Allocation

Context
An investor or lender assesses a portfolio company's exposure to transition risk, supply-chain disruption, or sustainability-linked financing requirements.

Challenge

- Inconsistent ESG disclosures

- Limited confidence in Scope 3 claims
- Weak evidence linking capital deployment to outcomes

SCERM© Application

- SCERM© outputs provide verified, attributable supply-chain data
- Unified records enable longitudinal tracking of progress
- Evidence supports use-of-proceeds and performance-linked structures

Outcome

- Improved risk pricing and underwriting confidence
- Greater clarity on transition credibility
- Reduced information asymmetry between capital providers and corporates

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6.4 Supplier Engagement and Value-Chain Transformation Use Case

Context

A company seeks to engage suppliers on emissions reduction, resilience, or social risk without imposing unrealistic reporting burdens.

Challenge

- Supplier data gaps
- Low engagement or capability
- Fragmented sustainability initiatives

SCERM© Application

- Interventions are designed around supplier realities
- Attribution logic aligns outcomes with procurement exposure
- Monitoring focuses on material outcomes rather than reporting volume

Outcome

- Practical supplier engagement
- Improved data quality over time
- Stronger supply-chain resilience and stability

6.5 Programme-Level Use Case: Portfolio or Landscape Initiatives

Context
A company or group of companies participates in regional or commodity-based programmes (e.g. landscape restoration, clean energy access, supplier transition).

Challenge

- Difficulty attributing shared outcomes
- Risk of generic or non-specific claims
- Limited disclosure usability

SCERM© Application

- Eligibility and attribution rules are applied at programme level
- Outcomes are allocated proportionally and transparently
- Verification is structured to support multiple participants

Outcome

- Scalable programmes with defensible attribution
- Consistent disclosure across participants
- Efficient reuse of verified data

6.6 Summary

Across use cases, SCERM© performs the same function:

- It structures evidence, rather than creating new claims
- It aligns supply-chain action with disclosure and decision-making needs
- It reduces duplication between sustainability, finance, and risk functions

SCERM© enables organisations and capital providers to move from aspirational Scope 3 narratives to evidence-based supply-chain transformation.

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7. Limitations and Boundaries of the SCERM© Method

SCERM© is designed to address specific structural failures in Scope 3 attribution, verification, and disclosure.
It is therefore deliberately bounded in scope.

Understanding what SCERM© does *not* attempt to do is essential to its correct application and credibility.

7.1 Not a Compliance Instrument

SCERM© is not a regulatory compliance instrument and does not substitute for obligations under emissions trading schemes, carbon taxes, or border adjustment mechanisms.

The method supports corporate disclosure, transition planning, and risk management, rather than direct regulatory settlement.

7.2 Not Universally Applicable to All Scope 3 Categories

SCERM© applies only where:

- Value-chain linkage is defensible
- Attribution logic is meaningful

- Outcomes can be measured and verified

Certain Scope 3 categories—particularly those involving diffuse consumer behaviour or highly fragmented downstream use—may fall outside the method's practical boundaries.

SCERM© favours precision over coverage.

7.3 Dependence on Data Availability and Supplier Engagement

SCERM© outcomes are constrained by:

- Availability of reliable activity data
- Supplier cooperation and access
- Local monitoring and verification capacity

Where supplier engagement is weak or data quality is poor, SCERM© outputs may be limited or phased over time.

This reflects real supply-chain conditions rather than methodological weakness.

7.4 Attribution Is Not Absolute Ownership

SCERM© attribution is proportional and conditional, not exclusive.

Recognised outcomes reflect a defined relationship between an intervention and a value-chain exposure.
They do not imply exclusive ownership of physical outcomes or environmental assets.

This distinction is critical to avoiding over-claiming and misrepresentation.

7.5 No Guarantee of Uniform Outcomes

SCERM© does not guarantee:

- Uniform emissions reductions across suppliers
- Predictable year-on-year performance

- Immediate alignment with corporate targets

Outcomes reflect **real-world variability**, including climate, operational, and social conditions.

The method prioritises **accuracy over predictability**.

7.6 Methodological Discipline over Narrative Flexibility

SCERM© imposes structure and discipline that may constrain:

- Marketing narratives
- Simplistic claims
- Aggregated headline metrics

This is intentional.
The method is designed to withstand audit, investor scrutiny, and regulatory evolution—not to optimise communications.

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8. Future Development and Interoperability

SCERM© is designed as a **living methodology**, capable of evolving alongside corporate reporting requirements, assurance practices, and capital-market expectations.

Future development is guided by three principles: **interoperability, robustness, and restraint**.

8.1 Interoperability with Emerging Standards

SCERM© is structured to remain compatible with evolving frameworks, including:

- Expanded Scope 3 requirements under CSRD and ISSB
- Nature-related disclosure standards
- Sector-specific transition guidance

Future updates will prioritise alignment without dependency, ensuring SCERM© remains usable across multiple disclosure regimes.

8.2 Enhanced Data Integration

As digital supply-chain tools mature, SCERM© anticipates:

- Deeper integration with procurement and ERP systems
- Improved supplier-level data capture
- Increased automation of attribution and monitoring processes

These developments aim to improve efficiency without compromising evidentiary quality.

8.3 Expanded Nature and Social Metrics

While emissions remain central, SCERM© is designed to support:

- Biodiversity and land-use indicators
- Water and ecosystem risk metrics
- Social and livelihood indicators linked to supply-chain stability

Expansion will be guided by **materiality and measurability**, rather than breadth.

8.4 Assurance and Governance Maturity

Future iterations of SCERM© may incorporate:

- Standardised assurance scopes
- Clearer guidance for internal audit integration
- Alignment with emerging expectations for sustainability assurance

These developments will be introduced incrementally to preserve methodological stability.

8.5 Method Stewardship

SCERM© development is governed through:

- Controlled methodological updates
- Transparent documentation of changes
- Prospective application to new outcomes

This ensures continuity, comparability, and confidence for users over time.

9. Final Thoughts

SCERM© was developed in response to a practical reality: real supply-chain action is advancing faster than the systems designed to recognise it.

Across industries, companies are investing in upstream interventions, supplier engagement, and transition programmes that materially affect emissions, land use, and social risk. Yet too often, these efforts remain disconnected from corporate disclosures, transition plans, and capital allocation decisions—not because the action lacks impact, but because the evidence lacks structure.

SCERM© addresses this gap by treating Scope 3 not as a reporting exercise, but as a governance and evidentiary challenge. By embedding eligibility, attribution, verification, and disclosure logic into a single methodological pathway, the method enables real-world supply-chain interventions to generate durable, decision-useful outcomes.

The method is deliberately constrained. It does not promise universal coverage, instant alignment with all standards, or simplified narratives. Instead, it prioritises discipline, transparency, and audit resilience—qualities that will become increasingly important as supply-chain disclosure matures.

As sustainability moves from aspiration to accountability, the value of action will depend less on intent and more on evidence.
SCERM© is designed to ensure that when supply-chain transformation occurs, it can be measured, attributed, and used with confidence.

10. References & Appendices

This section formalises the analytical foundations of the SCERM© methodology and supports transparency, traceability, and independent review. It is intended to ensure the methodology can be **scrutinised, cited, and reused** by corporates, auditors, researchers, and policymakers.

10.1 References

(All references verified or updated to 2025 publication year where applicable.)

MIT Sloan School of Management & Council of Supply Chain Management Professionals (CSCMP). (2025). *State of Sustainable Supply Chains 2025*. Cambridge, MA.

CDP Worldwide. (2025). *Global Supply Chain Report 2025: Value Chains at the Heart of Decarbonisation*. London: CDP.

World Economic Forum. (2025). *The Next Net Zero Challenge: Integrating Supply Chain Action and Scope 3 Reduction*. Geneva: WEF.

UNFCCC Supervisory Body. (2025). *Article 6.4 Mechanism: Draft Methodology Guidance*. Bonn: UNFCCC.

European Commission. (2025). *EU Emissions Trading System (Phase IV) and Carbon Border Adjustment Mechanism – Implementation Reports*. Brussels: Directorate-General for Climate Action.

Integrity Council for the Voluntary Carbon Market (ICVCM). (2025). *Core Carbon Principles and Assessment Framework*. London.

Voluntary Carbon Markets Integrity Initiative (VCMI). (2025). *Claims Code of Practice – 2025 Revision*. Geneva.

International Sustainability Standards Board (ISSB). (2025). *IFRS S2: Climate-Related Disclosures*. London: IFRS Foundation.

International Organization for Standardization (ISO). (2024). *ISO 14064-1:2018 and ISO 14064-2:2019 – Greenhouse Gas Quantification and Reporting*. Geneva.

Kyoto Network Research. (2025). *Internal Analysis on Supply-Chain Emission Reduction Efficiency and Attribution Models*. Leeds: Kyoto Network Ltd.

10.2 Appendices

10.2.1 Appendix A: SCERM© Attribution Equation (Illustrative Example)

For a company purchasing materials linked to a SCERM©-eligible supply-chain intervention, recognised outcomes are calculated using proportional attribution logic.

$$Rc = QP\ X\ \alpha\ X\ \beta$$

Where:

- **Q_P** = 50,000 tCO_2e
  (Verified emissions reduction or equivalent outcome at project level)

- **α** = 0.20
  (Share of output or exposure attributable to the company's procurement volume)

- **β** = 0.95
  (Verification and integrity coefficient reflecting assurance quality)

R_c=50,000×0.20×0.95=9,500 tCO_2e

Result:
9,500 tonnes of attributable reduction are recognised within the company's **Scope 3 inventory, transition planning, and sustainability disclosures**, supported by a single SCERM Verification Statement and unified data record.

This recognised outcome may be reused consistently across reporting and decision-making contexts without re-verification.

10.2.2 Appendix B: Key Definitions

Abbreviation	Full term / Meaning
SCERM©	Supply Chain Emission Reduction Method
MRV	Measurement, Reporting, and Verification – the structured process for quantifying, monitoring, and assuring outcomes
POL	Proof of Linkage – evidence connecting verified outcomes to a defined value-chain exposure
VRS	Verification Report Statement – documentation issued by an independent assurance provider confirming verified outcomes
RRE	Recognised Reduction Entry – the structured digital record of a SCERM©-recognised outcome
GHG	Greenhouse Gas
CO_2	Carbon dioxide
Scope 3	Indirect greenhouse gas emissions across a company's value chain
CSRD	Corporate Sustainability Reporting Directive (EU)
ESRS	European Sustainability Reporting Standards
GRI	Global Reporting Initiative
ISSB	International Sustainability Standards Board
IFRS S1 / S2	International Financial Reporting Standards Sustainability Disclosure Standards
SBTi	Science Based Targets initiative
FLAG	Forest, Land and Agriculture
CDP	Carbon Disclosure Project
UNFCCC	United Nations Framework Convention on Climate Change
ICVCM	Integrity Council for the Voluntary Carbon Market

WEF	World Economic Forum
MIT Sloan	MIT Sloan School of Management
ESG	Environmental, Social and Governance
ERP	Enterprise Resource Planning
ROI	Return on Investment
USD	United States Dollar
ITMO	Internationally Transferred Mitigation Outcome under Article 6 of the Paris Agreement
SHA-256	Cryptographic hash function used to generate immutable fingerprints of verification records, supporting data integrity and audit traceability

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10.2.3 Appendix C. List of Figures and Tables

Figure 1	*The SCERM© Logic Chain*	*From supply-chain intervention to disclosure-grade outcomes through eligibility screening, value-chain attribution, quantification and verification, a unified data record, and integration into disclosures to support strategic value creation.*

10.2.4 Appendix D: Acknowledgements

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“Integrity is not only what we measure — it is how evidence is structured, attributed, and used.”
— Kyoto Network Research Team, 2025