

PADV–ESG Behavioral Data Verification Methodology

White Paper v2.0

Publisher: EMJ LIFE Holdings Pte. Ltd. (Singapore)

Institutional Operator: PADV Behavioral Data Verification Framework

Date: 2025.09.15

Metadata Page

Title:

PADV-ESG Behavioral Data Verification Methodology White Paper v2.0

Publisher

EMJ LIFE Holdings Pte. Ltd. (Singapore)

Institutional Operator: PADV Behavioral Data Verification Framework

Version

v2.0 • 15 September 2025

Identifiers

- DOIs: 10.64969/padv.2025.v2
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Place of Publication

Singapore

Keywords

ESG • Scope 3 • PADV • Behavioral Data • Non-Tradable Carbon Credits (NTCC) • SDGS PASS • Institutional Assurance • Audit Framework • GRI • IFRS • COSO • QS

Value Statement

At its core, PADV (Participation–Action–Data–Value) provides the missing audit layer for sustainability. It transforms individual and enterprise actions into verifiable Proof Records, ensuring that participation becomes measurable, data becomes auditable, and value becomes comparable across global ESG frameworks.

Just as Visa created trust for financial transactions, PADV creates trust for behavioral data moving sustainability from claims to evidence, from intentions to outcomes.

Abstract

The PADV (Participation–Action–Data–Value) methodology establishes a new governance layer for ESG, transforming both individual and enterprise actions into verifiable behavioral data. By introducing a whitelist of thirty standardized modules, PADV provides a structured system that connects daily participation with internationally recognized disclosure frameworks.

At its core, PADV operates through the Proof Record mechanism and a unified task consumption scale (Low 100 / Medium 150 / High 200). This ensures that every activity whether a community-level engagement, a supply chain verification, or a financial governance task can be captured, assigned a comparable weight, and aligned with GRI, IFRS, COSO, and Scope 3 reporting requirements. The result is a transparent audit trail that minimizes greenwashing risks and strengthens institutional trust.

While the methodology is currently being piloted in Taiwan, its logic is designed for global replication. PADV demonstrates that if behavioral verification can function in one market, it can be scaled across markets, providing a universal verification infrastructure. In this way, PADV positions itself not as a competing standard, but as the missing layer of trust in ESG data, enabling regulators, enterprises, and investors to move from narrative-based reporting to verifiable sustainability outcomes.

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Chapter 1 | Institutional Positioning and Vision

1.1 PADV as the “Clearing Layer” of ESG

Environmental, Social, and Governance (ESG) reporting is facing a systemic bottleneck. While financial data has long benefited from standardized clearing infrastructures such as VISA or SWIFT, behavioral data underlying ESG remains fragmented, unverifiable, and often narrative-driven.

PADV (Participation–Action–Data–Value) positions itself as the first infrastructure-grade methodology to serve as a clearing layer for ESG behavior. It transforms decentralized participation activities into standardized Proof Records that can be verified, aggregated, and disclosed under global frameworks.

1.2 Two Core Instruments: SDGS PASS and NTCC

PADV is operationalized through two complementary instruments: SDGS PASS and NTCC (Non-Tradable Carbon Credit).

- SDGS PASS serves as the entry mechanism, ensuring that both individuals and enterprises can activate their participation identities (UIDs) through structured tasks and engagement pathways.
- NTCC converts validated participation into standardized carbon-equivalent values (10 points = 1 kgCO₂e). Unlike tradable offsets, NTCC is strictly non-transferable, ensuring it reflects verifiable, institution-bound reductions.

Together, SDGS PASS and NTCC ensure that diverse participation behaviors can be transformed into measurable and auditable ESG data.

1.3 Four Institutional Pillars

The PADV framework is sustained by four institutional pillars, each addressing a core weakness in current ESG practice:

- Disclosure – Every participation generates traceable, report-ready data fields.

- Uniqueness – Each record is bound by a three-ID scheme (UID, Product ID, Activity ID) preventing duplication.
- Verifiability – All actions require single or double redemption (QR/NFC), validated by smart contracts.
- Relevance – Proof Records are mapped directly to GRI, IFRS, COSO, and Scope 3 chapters.

1.4 Long-Term Mission

PADV's long-term mission is to evolve ESG reporting from static narratives to continuously upgrading, data-driven assurance. Starting from Scope 3 supplementation, PADV ultimately aims to enable full-chapter ESG coverage, ensuring that sustainability disclosures achieve the same reliability, comparability, and auditability as financial reporting.

Chapter 2 | Methodological Framework

2.1 Four-Stage Flow (P → A → D → V)

PADV standardizes ESG participation into a four-stage flow:

- Participation (P): Entry through SDGS PASS, either by completing the online quiz or engaging in assigned tasks.
- Action (A): Execution of verifiable activities, validated by single or double redemption mechanisms.
- Data (D): Conversion of actions into Proof Records, anchored by UID, Product ID, and SDGS Activity ID.
- Value (V): Transformation of Proof Records into NTCC, which are integrated into ESG disclosures and assurance frameworks.

2.2 Dual UID Logic

PADV operates under a dual-UID architecture to ensure distinct pathways for individuals and enterprises:

- Individual UID: Activated via the SDGS online quiz (17 items = 170 points). Each individual receives a unique UID (secured by NFC/NFT technology) enabling participation in redemption-based tasks. Task design includes a net reward mechanism (e.g., consume 20 points → gain 40 points) to sustain engagement.
- Enterprise UID: Activated when enterprises onboard tasks or contribute items to the Public Welfare Redemption Pool. Once approved, enterprises receive 200 baseline points. Unlike individuals, these points are not meant for consumption but serve as participation metrics, with substantive ESG value derived from NTCC generated through engagement volume and weighting factors.

2.3 Three-ID Scheme and Smart Contracts

Each task and action within PADV is secured by a three-ID scheme:

- UID: Personal or enterprise identity (immutable, secured via NFC/NFT).
- Product ID: Mission voucher ensuring exclusivity and preventing duplication.
- SDGS Activity ID: Unique identifier for each event or task instance.

All redemption processes are governed by smart contracts, guaranteeing immutability, preventing tampering, and enabling full traceability across the system.

2.4 Weighting Design and Calculation Logic

To reflect ESG dimensions with rigor, PADV applies a triple-factor weighting scheme:

- CEF (Carbon Effect Factor) → Environment (E)
- SEF (Social Effect Factor) → Social (S)
- IRF (Institutional Reliability Factor) → Governance (G)

Formula: $\text{Weight} = (\text{CEF} + \text{SEF} + \text{IRF}) / 15$

This design ensures that each Proof Record reflects not only activity volume but also its environmental, social, and governance relevance.

2.5 Point-to-Carbon Conversion

PADV provides a standardized conversion from participation points into carbon-equivalent data:

- Benchmark: 10 points = 1 kgCO₂e (e.g., one SDG online quiz completion = 10 points).
- NTCC Formula: $NTCC = \text{Participants} \times \text{Consumed Points} \times \text{Weight} \times 0.1$

This mechanism ensures NTCC is both auditable and comparable across contexts.

2.6 Recognition Principles

To prevent overestimation or inflation of ESG outcomes, PADV enforces strict recognition rules:

- Category A (Task-based NTCC): 100% recognized.
- Category B (Public Welfare Pool NTCC): Capped at 30% of (A + B).

This proportional principle balances inclusiveness of participation with institutional credibility.

Chapter 3 | Verification Chain and Six-Layer Boundary

3.1 End-to-End Verification Flow

The PADV verification chain ensures that every ESG-related action is fully traceable and auditable. The process is structured as follows:

1. Participation: Generation of an Individual UID (via SDGS PASS) or an Enterprise UID (via task onboarding).
2. Action: Product IDs (mission vouchers) are redeemed through single or double QR/NFC verification.

3. Proof Record: Immutable event records are generated using the three-ID scheme (UID × Product ID × SDGS Activity ID).
4. PADV Clearing Layer: Proof Records are aggregated and converted into NTCC datasets.
5. Independent Verification: Accredited bodies (e.g., ARES) conduct process checks, random sampling, and consistency testing.
6. Assurance Interface: Verified data is packaged into the PADV Assurance Pack, aligned with frameworks such as GRI, IFRS, and COSO.
7. Integration: NTCC and verified behavioral data flow directly into corporate sustainability reports and regulatory submissions.

3.2 Six-Layer Boundary Matrix

The six-layer boundary matrix defines the scope and integrity of PADV's verification framework:

1. Identity Boundary: UID ensures immutable personal and enterprise identification.
2. Activity Boundary: Each event is uniquely anchored by an SDGS Activity ID.
3. Asset Boundary: Product IDs define units of participation, preventing duplication or free riding.
4. Redemption Boundary: Single/double QR redemption, enforced via smart contracts, ensures that only completed tasks are recorded.
5. Data Boundary: Proof Records are stored immutably, hashed, and indexed to maintain a complete audit trail.
6. Assurance Boundary: Independent verification by accredited third parties (ARES, SGS, DNV, etc.) and alignment with Big Four audit frameworks guarantee governance-grade trust.

3.3 Anti-Double Counting and Reconciliation

To ensure data reliability, PADV enforces strict mechanisms against duplication and misreporting:

- **Anti-Double Counting:** Each UID × Product ID × SDGS Activity ID combination can only be redeemed once, enforced by smart contracts.
- **Sampling & Reconciliation:** Verifiers conduct random sampling of Proof Records, cross-checking with event logs to validate consistency.
- **Back-Casting Audits:** Historical activities remain verifiable through immutable Proof Records, enabling retroactive auditing and dispute resolution.

Chapter 4. Whitelist of 30 Modules

4.1 Module Categories and Positioning

The PADV Whitelist represents a curated system of 30 standardized modules, designed to convert both individual/community actions and enterprise/financial governance activities into verifiable Proof Records.

A-Series (A01–A16): Core modules focused on participation, education, and community engagement.

B-Series (B01–B14): Advanced modules focused on enterprise governance, supply chains, and financial institutions.

Together, these two categories form a comprehensive institutional framework that ensures comparability, auditability, and scalability across diverse contexts.

4.2 Core Modules (A01–A16) – Principles & Examples

The A-Series modules capture grassroots participation and educational actions, ensuring that individual contributions to sustainability are traceable and standardized.

Principles:

Simplicity: Modules are designed for broad accessibility.

Engagement: Focus on behavior change through gamified participation.

Education: Link individual actions to broader sustainability learning outcomes.

Examples:

- A02. Charity Activities Module – Participation in public welfare activities (blood donation, lectures, clean-up events) generates verifiable Proof Records.
- A08. Green Dining Module – Sustainable meal choices are recorded as Scope 3 emission reductions (kgCO₂e).
- A14. Public Transport Module – Use of mass transit systems logged as behavioral Proof Records, providing data for Scope 3 commuting emissions reductions.

4.3 Advanced Modules (B01–B14) – Principles & Examples

The B-Series modules operationalize ESG practices at the enterprise and institutional levels, linking governance and finance to verifiable outcomes.

Principles:

Materiality: Modules focus on high-impact corporate actions.

Verifiability: Each module generates auditable outputs aligned with disclosure frameworks.

Integration: Proof Records connect directly with Scope 3 carbon accounting and internal control systems.

Examples:

B05. Green Power Consumption Module – Records renewable kWh usage, mapped to GRI 302-1 and Scope 2 disclosures.

B07. Supply Chain ESG Verification Module – Supplier compliance is captured as Proof Records, supporting Scope 3-9 emissions reporting.

B11. Sustainable Finance Products Module – ESG funds, loans, and insurance

products generate Proof Records that align with IFRS S2 and Scope 3-15.

B14. Sustainable Finance Governance Module – Net-zero governance frameworks and risk control measures are Proof-logged under COSO and TCFD alignment.

4.4 Differentiated Point Tiers

To ensure cross-comparability while recognizing different levels of resource intensity, PADV introduces a dual-level point system:

A-Series (Individuals & Community)

Low = 20 points (simple participation, e.g., event check-in)

Medium = 30 points (moderate engagement, e.g., volunteering)

High = 50 points (sustained or leadership-level engagement)

B-Series (Enterprises & Financial)

Low = 100 points (basic disclosure or compliance)

Medium = 150 points (departmental coordination or ESG-linked product)

High = 200 points (strategic or capital-intensive actions, e.g., carbon finance issuance)

This differentiated scale makes individual actions and corporate actions comparable within one institutional framework without conflating their relative impact.

4.5 Institutional Value of the Whitelist

The Whitelist is not simply a catalog of activities that it is a governance instrument:

Standardization – Each module follows a uniform structure (ID, Sub-tasks, Flows, Mapping).

Auditability – Proof Records link directly to disclosure frameworks, enabling third-party assurance.

Scalability – Modules can be applied across industries, geographies, and institutional levels.

Trust Infrastructure – By embedding comparability and verification, the Whitelist becomes a foundational audit layer for ESG.

In this way, the Whitelist transforms sustainability from claims to evidence, ensuring that participation—whether individual or corporate and produces measurable, verifiable, and institutionally credible outcomes.

Chapter 5 | Disclosure Mapping Methodology

5.1 Mapping Logic

PADV employs a three-tier mapping approach to ensure that behavioral data progresses seamlessly from raw records into standardized ESG disclosures:

- Proof Record Layer: Each participation event is captured through the three-ID scheme (UID, Product ID, SDGS Activity ID).
- Field Layer: Proof Records are assigned weights (defined in Chapter 2.4) and converted into NTCC values (see Chapter 2.5).
- Chapter Layer: Standardized fields are then mapped directly into international reporting frameworks such as GRI, IFRS, COSO, and Scope 3

5.2 Weighting in Disclosure Context

The weighting factors (CEF, SEF, IRF) introduced in Chapter 2 are applied here to determine how each Proof Record contributes across the E, S, and G dimensions of reporting. This ensures that every activity is not only recorded but proportionally represented in disclosures, avoiding overemphasis on single-dimension impacts.

5.3 NTCC in Disclosure Context

NTCC, as defined in Chapter 2, serves as the carbon-equivalent anchor for Scope 3 reporting. Within the disclosure process, NTCC values are placed

alongside financial and operational metrics, enabling direct comparability, auditability, and integration into sustainability reports.

5.4 Application of Recognition Principles

The recognition principles introduced in Chapter 2.6 (100% for Category A, capped at 30% for Category B) are applied directly in the mapping process. In practice, only recognized portions of NTCC are included in disclosure tables, ensuring consistency, reliability, and institutional credibility.

5.5 Example Mapping Table

Below is an illustrative excerpt showing how an Exhibition Module (A01) is mapped to reporting standards. The complete mapping of 30 modules (100+ sub-tasks) is included in Appendices A–B.

Module ID	Sub-task	Suggested Points	Weight (from Ch. 2)	NTCC Reference	GRI Mapping	IFRS Mapping	Scope 3 Mapping	COSO Alignment
A01-1	Green Ticket	20	Applied from Ch. 2	NTCC formula from Ch. 2	GRI 302/305 (Energy/Emissions)	IFRS S2 (Climate Risk)	Cat. 9 (Downstream Transport)	Governance Assurance
A01-2	Eco Cup	30	Applied from Ch. 2	NTCC formula from Ch. 2	GRI 301 (Materials)	IFRS S1	Cat. 5 (Waste from Operations)	Operational Control

5.6 Scope 3 Coverage Matrix

PADV's 30 modules (A01–A17, B01–B13) provide comprehensive coverage of Scope 3 categories under the GHG Protocol.

Examples:

- Cat. 1 Purchased Goods & Services → B02 Green Procurement Module, B04 Food Supply Chain Module

- Cat. 6 Business Travel → A08 Business Travel Module
- Cat. 7 Employee Commuting → A15 Public Transport Module, A07 Remote Work Module
- Cat. 15 Investments → B11 Sustainable Finance Products Module

5.7 Summary

PADV establishes a direct and verifiable disclosure pipeline:

- Proof Records anchor raw participation.
- Weights and NTCC (defined in Chapter 2) serve as the quantitative basis for ESG metrics.
- Whitelist Modules map seamlessly into GRI, IFRS, COSO, and Scope 3.

By institutionalizing behavioral data in this way, PADV closes the verification gap in Scope 3 and delivers disclosure-ready datasets to regulators, enterprises, and assurance bodies.

Chapter 6 | Alignment with International Standards

6.1 GRI × PADV

The Global Reporting Initiative (GRI) emphasizes transparency across environmental, social, and governance dimensions. PADV strengthens GRI disclosures by providing measurable evidence where narrative reporting has traditionally dominated:

- GRI 301 (Materials): Captured through recycling and eco-product modules (e.g., A01 Eco Cup).
- GRI 302/305 (Energy & Emissions): Captured through travel, exhibition, and renewable energy modules (e.g., A08 Business Travel, B05 Renewable Energy).
- GRI 403 (Occupational Health & Safety): Captured through health and well-being modules (e.g., A14 Healthy Living).

6.2 IFRS × PADV

The IFRS Sustainability Disclosure Standards (S1 & S2) demand financially material, decision-useful sustainability information. PADV fulfills this by converting behaviors into standardized Proof Records and NTCC data:

- IFRS S1 (General Requirements): PADV provides governance-ready datasets that ensure reliability and comparability.
- IFRS S2 (Climate-related Disclosures): PADV closes the disclosure gap in Scope 3 by providing standardized, auditable NTCC metrics.

6.3 COSO × PADV

The COSO Internal Control – Integrated Framework is widely used to assess governance and risk management. PADV complements COSO through:

- Control Activities: Proof Records are immutable, reducing risk of manipulation.
- Information & Communication: The PADV Assurance Pack provides standardized ESG data streams into enterprise reporting.
- Monitoring Activities: Sampling and reconciliation processes enable continuous oversight and strengthen assurance credibility.

6.4 TCFD × PADV

The Task Force on Climate-related Financial Disclosures (TCFD) requires metrics, targets, and governance evidence. PADV provides concrete data for Scope 3 climate disclosures:

- Metrics & Targets: NTCC establishes verifiable baselines for Scope 3.
- Risk Management: Proof Records highlight behavioral and supply chain vulnerabilities.
- Governance: PADV modules support institutional accountability for climate risks.

6.5 ISO and Other Standards

PADV aligns with several ISO standards relevant to sustainability verification:

- ISO 14064 (Greenhouse Gas Accounting): NTCC is consistent with GHG inventory methodologies.
- ISO 37000 (Governance of Organizations): Reinforced by PADV's governance weighting factor (IRF).
- ISO 26000 (Social Responsibility): Strengthened by community-based participation modules (e.g., volunteering, blood donation, education).

6.6 QS × PADV

The QS Sustainability Ranking evaluates universities on their environmental and social impact. PADV enables higher education institutions to convert student, staff, and institutional actions into quantifiable sustainability evidence:

- Environmental Impact: Campus modules (e.g., A07 Remote Work, A15 Public Transport, B05 Renewable Energy) generate verifiable Scope 3 datasets.
- Social Impact: Community engagement (e.g., blood donation, volunteering, SDGs quizzes) provides measurable contributions to society.
- Governance & Institutional Commitment: Enterprise modules (e.g., B01 Upstream–Downstream Collaboration, B02 Green Procurement) reflect sustainable supply chain integration.

By embedding PADV into EDU SDGS PASS, universities can translate participation into standardized datasets that directly support QS Sustainability Ranking performance.

6.7 Alignment Matrix

A consolidated PADV × International Standards Matrix (Appendix D) demonstrates how the 30 Whitelist Modules align across GRI, IFRS, COSO,

TCFD, ISO, QS, and Scope 3. This matrix serves as a single reference for enterprises, regulators, auditors, and universities, ensuring that participation data can be recognized under multiple international frameworks simultaneously.

Chapter 7 | Pilots and Case Studies

7.1 Trade Fair Pilot – Taiwan Pet Expo Series

The PADV framework was piloted across a series of major pet exhibitions in Taiwan. Visitors activated their UIDs via SDGS PASS, completed sustainability quizzes, and redeemed eco-friendly products at the Public Welfare Redemption Pool.

Results:

- 2,368 successful redemptions recorded
- 2,455,050 points accumulated
- 18 exhibitors onboarded into the Redemption Pool
- 8,754.25 kgCO₂e NTCC generated

Value: This pilot demonstrated PADV's capacity to convert large-scale event participation into auditable ESG data, turning visitor traffic into verified Scope 3 disclosures for organizers and exhibitors.

7.2 Public Welfare Pilot – Rotary Blood Donation

In collaboration with Rotary International District 3522 (Taiwan), PADV was deployed at a blood donation drive in Taipei's Ximending district. Participants registered via QR scan, completed the SDGS quiz, and earned points that could be redeemed for goods provided by Rotary.

Results:

- Seamless integration of public welfare participation into PADV
- Real-time NTCC generation from community health activities
- Proof of concept for NGO and civil society alignment

Value: This pilot confirmed that PADV can embed community and public welfare activities into institutional reporting, linking grassroots initiatives with global ESG disclosure frameworks.

7.3 Campus Pilot – EDU SDGS PASS

Universities in Taiwan piloted EDU SDGS PASS to align student and faculty participation with both PADV and QS Sustainability Ranking requirements. Activities included volunteering, public transport use, renewable energy workshops, and SDGs quizzes.

Results:

- Students and faculty accumulated points linked to individual UIDs
- Proof Records demonstrated measurable contributions to Scope 3 categories such as commuting and energy use
- Governance integration through university-level Enterprise UIDs

Value: The pilot provided a pathway for higher education institutions to translate student and faculty actions into standardized sustainability datasets, directly supporting QS evaluation criteria.

7.4 Corporate Pilot – Pre-Study with a Big Four Firm and a Taiwanese ESG Verification Body

In collaboration with a Big Four accounting firm and a Taiwanese ESG verification body, PADV was tested for corporate ESG disclosure readiness. Enterprise UIDs were activated to simulate onboarding of suppliers, employees, and event participation.

Results:

- Draft Assurance Pack prepared for alignment with international audit standards
- Scope 3 datasets validated through sampling and reconciliation
- Early evidence of scalability for multinational adoption

Value: The pilot confirmed that PADV can meet audit-grade requirements, bridging the gap between corporate sustainability commitments and verifiable disclosure.

Note: References to external institutions indicate preliminary technical dialogues and pre-study engagements, and do not constitute formal endorsements.

7.5 Pilot Case Summary Matrix

Pilot Type	Key Activities	Results	ESG Value Contribution
Trade Fair	Quizzes, redemptions, exhibitor onboarding	2,455,050 points; 8,754.25 kgCO ₂ e	Event-based Scope 3 disclosure
Public Welfare	Blood donation drive (Rotary)	Verified NTCC from health activity	NGO & community data integration
Campus EDU	Student & faculty engagement	Participation data aligned with QS	Higher education sustainability reporting
Corporate	Deloitte & ARES pre-study	Assurance Pack prototype	Audit-grade Scope 3 datasets

Chapter 8 | Regulatory & Assurance Value

8.1 For Regulators

Regulators require sustainability disclosures that are consistent, comparable, and verifiable. PADV addresses this need by:

- **Standardized Proof Records:** Each participation event is captured via the three-ID scheme and validated through smart contracts.
- **Assurance Pack Delivery:** Regulatory bodies can directly access pre-structured disclosure datasets aligned with GRI, IFRS, COSO, and Scope 3.
- **Full Traceability:** Immutable Proof Records provide an audit trail from

individual actions to aggregated disclosures, enabling oversight and compliance checks.

Value: PADV strengthens regulatory trust by providing a new assurance layer for Scope 3, historically the weakest element in ESG reporting.

8.2 For Auditors & Assurance Bodies

Auditors and assurance providers (e.g., Big Four accounting firms, accredited verification agencies) require governance-grade datasets. PADV enables them to:

- **Access Verifiable Records:** Proof Records can be sampled, reconciled, and validated against participation logs.
- **Leverage the Assurance Pack:** A standardized reporting package that includes sampling protocols, reconciliation methods, and field-to-chapter mappings.
- **Reduce Audit Burden:** By providing pre-validated data, PADV decreases the time and cost associated with third-party verification.

Value: PADV enables auditors to move beyond narrative-based ESG reports, providing concrete behavioral datasets that integrate seamlessly into existing audit frameworks.

8.3 For Enterprises

Enterprises face growing pressure to demonstrate credible ESG performance. PADV offers them:

- **Actionable Data:** Real-time participation data from employees, consumers, and supply chains.
- **Scope 3 Integration:** NTCC and Proof Records can be disclosed alongside financial and operational metrics, closing a critical reporting gap.
- **Risk Management:** PADV's six-layer boundary ensures governance, privacy, and security of ESG data.

Value: PADV provides enterprises with a low-friction path to verifiable ESG reporting, enhancing credibility with regulators, investors, and customers.

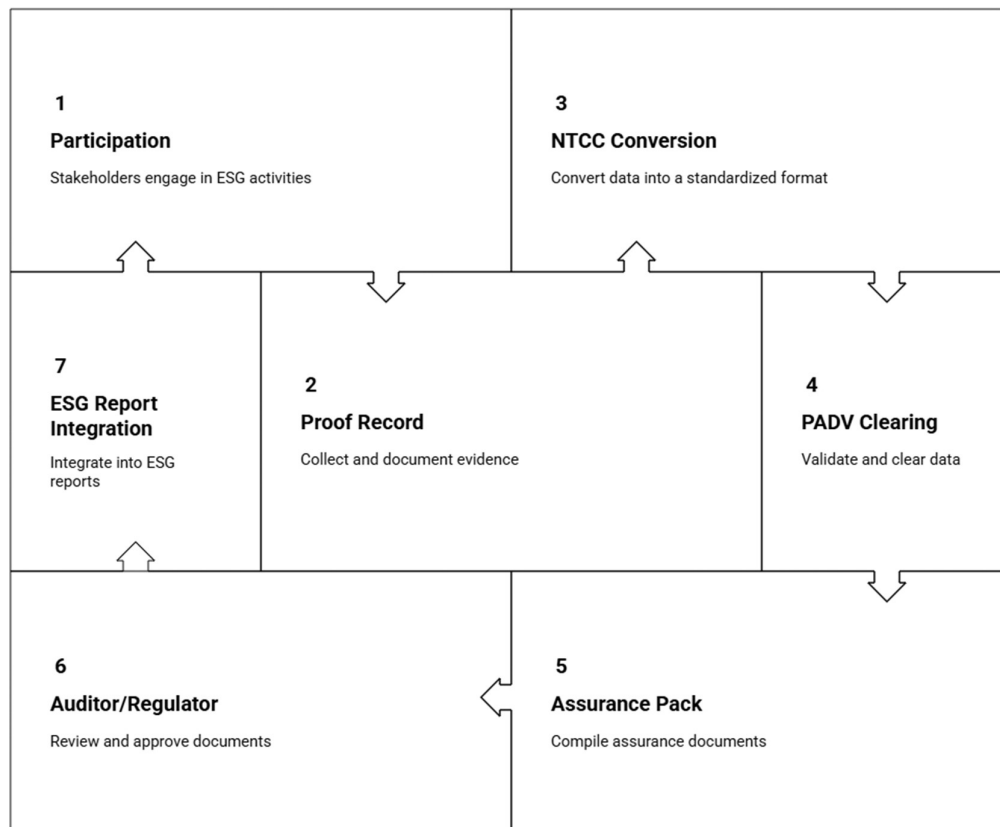
8.4 Strategic Positioning

PADV functions as the assurance-ready clearing layer of ESG data. By institutionalizing participation through standardized modules, PADV provides:

- For Regulators: Compliance-ready disclosures
- For Auditors: Verifiable datasets and Assurance Packs
- For Enterprises: Credible Scope 3 evidence

The result is a governance-grade data infrastructure, ensuring that ESG disclosures achieve the same reliability as financial reporting.

8.5 Verification & Assurance Flow Diagram



Chapter 9 | Governance, Cybersecurity, and Privacy

9.1 Governance Structure

PADV embeds governance at both the platform and institutional levels:

- **Platform Governance:** Managed by EMJ.LIFE Holdings, with oversight from independent auditors and verification partners (e.g., Deloitte, ARES).
- **Data Governance:** Proof Records are standardized and immutable, ensuring reliability for third-party assurance.
- **Institutional Participation:** Enterprises and universities activate Enterprise UIDs, binding their participation to governance responsibilities and reporting accountability.

Value: Governance ensures that PADV operates as a transparent, auditable infrastructure, preventing misuse and sustaining long-term trust.

9.2 Cybersecurity Protection

PADV employs multi-layered cybersecurity protocols to secure ESG behavioral data:

- **Smart Contract Enforcement:** Prevents tampering and guarantees the immutability of Proof Records.
- **Encryption & Hashing:** All Proof Records are hashed and time-stamped to create verifiable audit trails.
- **Boundary Controls:** The six-layer boundary (Chapter 3) defines strict limits on identity, activity, asset, redemption, data, and assurance layers.
- **Incident Monitoring:** Continuous monitoring for anomalies, with blacklisting mechanisms for compromised UIDs or fraudulent activity.

Value: Cybersecurity safeguards ensure that ESG data retains integrity across collection, verification, and disclosure stages.

9.3 Privacy Protection

PADV follows a privacy-by-design principle, ensuring compliance with global data protection standards (e.g., GDPR, Singapore PDPA):

- **Minimal Data Collection:** UIDs do not require sensitive personal data; participation is verified without exposing identities.
- **Anonymization & Aggregation:** Proof Records are anonymized before integration into Assurance Packs or reports.
- **Consent Management:** Participants must explicitly opt in before data is collected or linked to enterprise UIDs.
- **Data Retention Policy:** Proof Records are stored in hashed form for seven years, ensuring auditability while respecting retention limits.

Value: Privacy protection ensures that PADV builds trust not only with regulators and enterprises, but also with individuals whose actions underpin ESG datasets.

Chapter 10 | Implementation & Operations

10.1 Implementation Steps

PADV implementation follows a structured roadmap, allowing organizations to progressively integrate the framework:

1. **Onboarding** – Enterprises or institutions register for Enterprise UIDs; individuals activate UIDs via SDGS PASS.
2. **Module Selection** – Choose relevant Whitelist Modules (A01–A16 for B2C/employee; B01–B14 for B2B/supply chain).
3. **Task Deployment** – Define participation tasks, redemption mechanisms (QR/NFC), and reporting fields.
4. **Proof Record Generation** – Activities are logged using the three-ID scheme and secured via smart contracts.
5. **Data Aggregation** – Proof Records are converted into NTCC and aligned

with ESG reporting chapters.

6. Assurance Pack Delivery – Data is packaged for auditors, regulators, or rating agencies.
7. Disclosure Integration – Outputs are embedded into ESG reports, sustainability rankings, and compliance filings.

10.2 Operational Logic

PADV's operational model ensures continuity between participation and reporting:

- Sandbox Environments: PET JOURNEY, SDGS PASS, and EDU SDGS PASS serve as entry sandboxes for different audiences.
- Weekly Point Cycles: Points and Proof Records are processed in weekly cycles, balancing user engagement with system efficiency.
- Task Multipliers: Standardized multipliers (e.g., 1×, 1.5×) ensure fairness across campaigns; arbitrary adjustments are prohibited.
- Cross-Sector Integration: PADV integrates seamlessly with events, NGOs, universities, corporates, and supply chains.

10.3 System Integration

To ensure interoperability, PADV connects with existing IT and compliance infrastructures:

- API Connectivity: Enterprises can push Proof Records into corporate ESG dashboards or regulatory filing systems.
- Audit Interfaces: The Assurance Pack provides machine-readable formats (CSV, XML, JSON) for auditors.
- Blockchain Anchoring: Select Proof Records are hashed and anchored to public blockchains, enhancing global verifiability.
- Data Security & Backup: All records are encrypted, geo-redundantly stored, and subject to periodic penetration testing.

10.4 Continuous Upgrading

PADV is designed as a living framework, allowing new modules, standards, and assurance protocols to be added without disrupting operations.

- Scalability: New industry-specific modules can be developed and appended to the Whitelist.
- Interoperability: PADV outputs can be synchronized with evolving global frameworks (e.g., ISSB, SEC climate rules).
- Feedback Loops: Data from pilots and assurance reviews feed back into system design, enabling continuous improvement.

Ch11. Capital Market Application

11.1 PADV as the “Visa of ESG Data”

In financial history, the emergence of Visa created a universal trust layer for global payment transactions. It standardized clearing and settlement, making cross-border commerce scalable and auditable.

Similarly, PADV (Participation–Action–Data–Value) establishes a clearing layer for ESG behavioral data. By transforming millions of fragmented participation actions into verifiable Proof Records, PADV ensures that Scope 3 activities, CSR initiatives, and sustainability engagements are not only measured but also auditable.

11.2 De-risking ESG Investments

Investors face three persistent challenges in ESG and impact capital allocation:

1. Greenwashing Risk – Lack of reliable data undermines ESG scoring and investor confidence.
2. Disclosure Gaps – Scope 3 remains under-reported, creating blind spots in risk analysis.
3. Lack of Standardization – Data formats differ across regions, making

assurance costly and inconsistent.

PADV directly addresses these challenges by:

- Providing whitelisted modules (A01–A16 / B01–B14) that map each action to GRI, IFRS, COSO, and Scope 3.
- Converting participation into Proof Records that are traceable, immutable, and verifiable by third parties.
- Enabling Assurance Packs that can be used by auditors (Big 4, verification bodies) as ready-to-integrate evidence.

For investors, this translates into de-risked ESG portfolios and higher credibility of disclosures.

11.3 Applications in Capital Markets

(a) Sovereign Wealth Funds & Impact Funds

- PADV data enables GIC, Temasek, and other SWFs to evaluate portfolio companies' ESG commitments with verifiable behavioral evidence.
- Enhances impact allocation by linking investments to measurable SDG-aligned outcomes.

(b) Listed Companies & Corporate Issuers

- Corporates can embed PADV modules into supply chain, HR, and customer engagement.
- This produces Assurance Packs that strengthen annual ESG disclosures, reducing audit costs and increasing credibility.

(c) Funds, REITs, and Green Bonds

- PADV creates a mechanism where fund managers can demonstrate ongoing ESG performance of their assets.
- Scope 3 behavioral data can be embedded in prospectuses or bond frameworks, providing regulators and investors with real-time accountability.

11.4 Transforming Data into Value

The PADV methodology closes the loop between participation → proof → assurance → capital allocation.

- For enterprises: reduces compliance friction and improves ESG ratings.
- For auditors: provides structured modules for efficient verification.
- For investors: de-risks ESG allocations and supports performance-based sustainability financing.

In short, PADV is not only a methodology but also a capital market infrastructure for ESG behavioral data, enabling investors to trust, measure, and scale sustainability impact.

Chapter 12. Third-Party Verification Alignment

12.1 Institutional Context

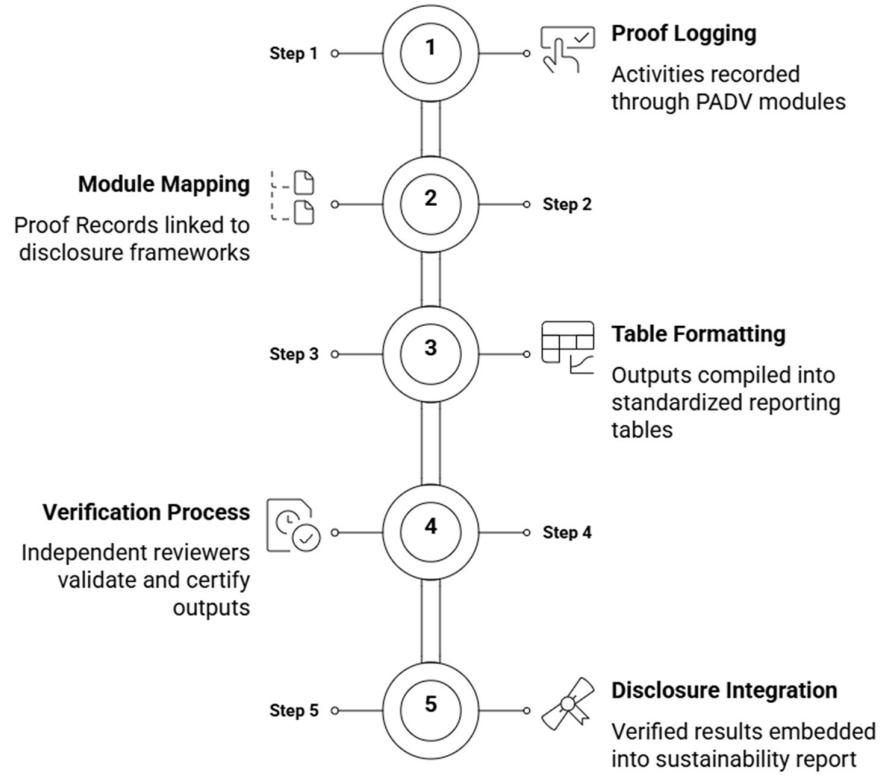
Verification is the foundation of trust in ESG. While disclosure frameworks define *what* to report, credibility ultimately depends on *how* data is verified. PADV addresses this gap by standardizing behavioral data into Proof Records that can be tested, validated, and certified by independent assurance processes.

12.2 Alignment Principles

1. Standardization – Each whitelist module (A01–A16, B01–B14) is mapped to disclosure fields under GRI, IFRS, COSO, and Scope 3.
2. Auditability – Proof Records use traceable IDs (UID, Product ID, SDGS Activity ID) to create a verifiable evidence chain.
3. Dual-Level Governance – Both A-series (individual/community) and B-series (enterprise/financial) modules link directly to audit-relevant outcomes.
4. Institutional Neutrality – PADV tables are designed to be applied across any type of verification institution without bias toward specific

organizations.

12.3 Verification Flow



12.4 Reference Formats

Format A – Audit-Oriented Table

Module ID	Sub-task	Proof Record Output	Disclosure Standard Mapping	Assurance Dimension
A08	Green Dining	Participation counts, kgCO ₂ e reduced	GRI 302, IFRS S2, Scope 3-1	Climate & Energy
B05	Green Power Consumption	Renewable kWh consumption	GRI 302-1, Scope 2	Energy & Resource Use

Module ID	Sub-task	Proof Record Output	Disclosure Standard Mapping	Assurance Dimension
B11	Sustainable Finance Products	Loan/fund/insurance Proof Records	GRI 201, IFRS S2, Scope 3-15	Finance & Investment

(Designed for assurance-led reviews where data is tested against global disclosure frameworks.)

Format B – Verification-Oriented Table

Module ID	Sub-task	Proof Record Output	Verification Focus	Data Integrity Check
A03	Campus Engagement	Student participation, PASS points	Community Participation	Cross-check with attendance logs
B07	Supply Chain ESG Verification	Supplier compliance records	Supply Chain Assurance	Validation of Proof chains
B14	Sustainable Finance Governance	Risk frameworks, net-zero roadmaps	Institutional Governance	Internal control alignment

(Designed for independent verification processes emphasizing data integrity, traceability, and cross-checking mechanisms.)

12.5 Summary

By providing dual reporting formats, PADV ensures that Proof Records can integrate seamlessly into both assurance-oriented audits and verification-oriented reviews. This flexibility allows enterprises to embed PADV into disclosures with confidence, knowing that their data will withstand third-party scrutiny.

PADV thus positions itself as a universal audit layer for ESG behavioral data not competing with existing standards, but operationalizing them through verifiable, traceable, and institutionally neutral data structures.

Conclusion

This white paper has outlined the PADV (Participation–Action–Data–Value) methodology as a standardized framework for translating behavioral participation into verifiable ESG data. By integrating modularized Proof Records, proportional weighting, NTCC calculations, and Scope 3 coverage mapping, PADV provides a structured pathway for organizations and individuals to transform sustainability commitments into auditable outcomes.

The inclusion of alignment with GRI, IFRS, COSO, TCFD, ISO, and QS standards ensures that PADV is not positioned as an alternative to existing frameworks but as a verification layer that operationalizes them. The Assurance Pack, with sampling protocols, reconciliation methods, and machine-readable outputs, further demonstrates how PADV can be seamlessly integrated into corporate reporting and third-party assurance processes.

What began as a pilot in Taiwan has proven that PADV is practical, scalable, and institutionally relevant. The system shows that when behavior is logged, standardized, and verified, it becomes possible to bridge the trust gap in ESG disclosure moving from claims to evidence, from intentions to measurable outcomes.

As ESG data continues to evolve into a global asset class, PADV offers regulators, auditors, and investors a transparent and auditable mechanism to ensure that sustainability actions are credible, comparable, and accountable. In doing so, PADV aspires to become the foundational infrastructure for behavioral trust in the next generation of ESG governance.

Acknowledgments and Supporting Institutions

The development of this white paper has been strengthened by the insights and contributions of stakeholders across academia, industry, government, and professional practice. We gratefully acknowledge the following groups:

- Pilot partners who provided real-world environments to test and refine the PADV whitelist modules.

- Academic advisors who contributed expertise on sustainability education and the integration of SDGs into institutional practice.
- Audit and verification experts who provided valuable feedback on calculation formulas, proportional rules, and assurance protocols.
- Industry stakeholders who participated in workshops and consultations to ensure that the framework remains practical, scalable, and globally relevant.
- Taiwan Stock Exchange (TWSE) and Taipei Exchange (TPEX) for their constructive input in discussions on corporate governance and sustainability disclosure frameworks.
- Governmental authorities including the Financial Supervisory Commission, National Development Council, Ministry of Environment, and Ministry of Education for their recognition of the framework's potential and their valuable recommendations on institutional alignment.

Their engagement has been invaluable in ensuring that PADV is not only a conceptual methodology but also an operational framework capable of addressing the realities of disclosure, verification, and assurance.

Disclaimer: The inclusion of these institutions reflects their contributions through discussion and feedback. The final content, conclusions, and recommendations of this white paper remain the sole responsibility of the authors and do not constitute formal endorsement by the listed parties.

Appendices

Appendix A – Whitelist Core Modules (A01–A16)

- Detailed descriptions of each core module (e.g., exhibitions, commuting, dining, health, events).
- Suggested point tiers (20 / 30 / 50).
- Application scenarios (B2C, employee participation).
- Disclosure mapping references (GRI, IFRS, Scope 3, COSO).

Appendix B – Whitelist Advanced Modules (B01–B14)

- Detailed descriptions of advanced modules (e.g., green procurement, renewable energy, sustainable finance).
- Suggested point tiers (100 / 150 / 200).
- Application scenarios (B2B, supply chain, institutional governance).
- Disclosure mapping references (GRI, IFRS, Scope 3, COSO).

Appendix C – Calculation Formulas and Proportional Rules

- Weight Formula: $\text{Weight} = (\text{CEF} + \text{SEF} + \text{IRF}) / 15$
- NTCC Formula: $\text{NTCC} = \text{Participants} \times \text{Points} \times \text{Weight} \times 0.1$
- Application examples (with small calculation samples).
- Recognition principle reference (100% for Category A, 30% cap for Category B).

Appendix D – Scope 3 Coverage Matrix

- Full mapping of PADV modules (A01–A16, B01–B14) to the 15 Scope 3 categories under the GHG Protocol.
- Tables showing category-by-category coverage.

- Highlight of coverage density (“hot zones” of Scope 3 alignment).

Appendix E – International Standards Alignment Matrix

- Consolidated PADV × International Standards reference table.
- Columns for GRI / IFRS / COSO / TCFD / ISO / QS.
- Cross-reference to module IDs and Proof Records.

Appendix F – Assurance Pack Template

- Structure of the PADV Assurance Pack (sampling protocols, reconciliation methods, field-to-chapter mapping).
- Machine-readable output formats (CSV, XML, JSON).
- Suggested sampling rates and audit tolerance thresholds.

Appendix G – PADV Implementation Guide

- Structure of the PADV Enterprise Onboarding Process
- Machine-readable output formats
- Suggested implementation checkpoints and verification thresholds

Appendix A – Whitelist Core Modules (A01–A16)

Module ID	Module Name	One-Line Narrative
A01	Exhibition Module	Capture sustainability participation and behavior data during exhibitions and trade shows.
A02	Charity Activities Module	Convert public welfare actions (blood donation, lectures, clean-ups, runs) into Proof Records.
A03	Campus Module	Record SDG-linked student and faculty participation within campus environments.
A04	Employee ESG Tasks Module	Standardize and Proof-log ESG-related assignments performed by employees.
A05	Digital Conference Module	Record reduced travel impact and ESG engagement from digital/virtual meetings.
A06	Remote Work Module	Convert teleworking practices into verifiable Scope 3 reduction Proof Records.
A07	Business Travel Module	Log and verify emissions data related to business travel choices.
A08	Green Dining Module	Proof-log sustainable food choices and reduced carbon dining behaviors.
A09	Healthy Living Module	Record wellness activities that contribute to social and ESG reporting.
A10	E-commerce Logistics Module	Track sustainable packaging and logistics behavior in online shopping.
A11	Cultural Activities Module	Convert cultural participation into ESG-related

Module ID	Module Name	One-Line Narrative
		Proof Records.
A12	Sustainable Accommodation Module	Capture green hotel/lodging practices as Proof Records for Scope 3.
A13	EV Leasing Module	Record adoption and usage of electric vehicle leasing services.
A14	Public Transport Module	Proof-log usage of low-carbon public transport modes.
A15	Community Activities Module	Record participation in community service and sustainability initiatives.
A16	Service Upgrade Module	Convert service improvement activities into Proof Records linked to SDGs.

Sub-task ID	Sub-task Name	Headline / Institutional Narrative	Three-ID (UID / Product ID / SDGS Activity ID)	Initiator Flow	Participant Flow	Suggested Initiators / Users / Participants	Mapping (Points • Weight • NTCC) & Standards
A01-1	Green Ticket	<i>Transform entry tickets into Proof Records; ensure that admission generates both foot traffic and ESG evidence.</i>	UID: participant ; Product ID: entry/green ticket ; SDGS Activity ID: A01-1	Organizer issues green tickets → defines check-in/redemption points → optional booth add-ons	Participant redeems ticket → scans QR/NFC at entry → optional booth interaction → Proof Record generated	Initiators: exhibition organizers ; Users: hosts, venues, exhibitors ; Participants: visitors, staff	20 pts • 0.87 → <i>Participants</i> × $20 \times 0.87 \times 0.1 \rightarrow$ GRI 305/302/306/413 ; IFRS S2-6 Metrics & Targets ; Scope 3-6/7/9 ; COSO: Control Environment / Risk Assessment / Control Activities / Monitoring
A01-2	Public-Welfare Interaction	<i>Redirect exhibition traffic to CSR/NGO booths; each welfare interaction becomes a Proof Record.</i>	UID: participant ; Product ID: welfare voucher ; SDGS Activity ID: A01-2	NGO/booth defines welfare activity → lists vouchers → sets up booth redemption	Participant scans voucher → engages in welfare activity → Proof Record generated	Initiators: NGOs, CSR teams ; Users: show hosts, NGOs, brands ; Participants: visitors, employees	30 pts • 0.80 → <i>Participants</i> × $30 \times 0.80 \times 0.1 \rightarrow$ GRI 413/403/404 ; IFRS S1-22 Governance & Strategy, S1-20 Human Capital ; Scope 3 supplemental (social/community participation) ; COSO: Control

							Environment / Risk Assessment / Monitoring
A01-3	Eco-Cup (One-Day)	<i>Make reusable cups measurable; Proof Records capture the cycle of "pickup → use → return."</i>	UID: participant ; Product ID: eco-cup voucher ; SDGS Activity ID: A01-3	F&B vendor/organizer lists eco-cup vouchers → sets pickup & return redemption	Participant redeems voucher → collects eco-cup → uses → returns for Proof Record	Initiators: F&B vendors, organizers ; Users: F&B brands, venues ; Participants: visitors, staff	30 pts • 0.80 → <i>Participants</i> × <i>30 × 0.80 × 0.1</i> → GRI 306/301/305 ; IFRS S2-13 Resource Efficiency ; Scope 3-12 End-of-Life Waste, 3-1 Purchased Goods & Services ; COSO: Risk Assessment / Info & Communication / Control Activities
A01-4	Sustainability Map	<i>Turn venue navigation into Proof Records; incentivize booth visits and quantify sustainable engagement.</i>	UID: participant ; Product ID: map voucher ; SDGS Activity ID: A01-4	Organizer designs sustainability route → booths add checkpoints → issues vouchers	Participant redeems map voucher → scans checkpoints across booths → completes tour → Proof Record generated	Initiators: exhibition organizers ; Users: exhibitors, brands ; Participants: visitors, booth attendees	50 pts • 0.93 → <i>Participants</i> × <i>50 × 0.93 × 0.1</i> → GRI 302/305/413 ; IFRS S2 Transition Planning ; Scope 3-6/7/9 (transport & commuting) ; COSO: Info & Communication / Monitoring / Control Activities
A02-1	Blood Donation	<i>Transform blood donation into Proof Records; quantify health and community contributions.</i>	UID: donor ; Product ID: donation voucher ; SDGS Activity ID: A02-1	NGO/health org defines event → issues donation vouchers → sets redemption	Participant registers via QR → donates blood → scans voucher → Proof Record generated	Initiators: Rotary, Red Cross, hospitals ; Users: NGOs, CSR teams ; Participants: citizens, students, employees	30 pts • 0.80 → <i>Participants</i> × <i>30 × 0.80 × 0.1</i> → GRI 403/413 ; IFRS S1-20 Human Capital, S1-29 Social Responsibility ; Scope 3 supplemental (employee/community social responsibility) ; COSO: Control Environment / Risk Assessment / Control Activities / Monitoring
A02-2	Public Welfare Lecture	<i>Turn attendance at CSR/NGO lectures into Proof Records; measure social learning and awareness.</i>	UID: attendee ; Product ID: lecture voucher ; SDGS Activity ID: A02-2	NGO/CSR unit lists lecture event → issues vouchers → defines redemption	Participant registers via QR → attends lecture → redeems at exit → Proof Record generated	Initiators: NGOs, schools, CSR teams ; Users: universities, enterprises ; Participants: students, employees, citizens	20 pts • 0.80 → <i>Participants</i> × <i>20 × 0.70 × 0.1</i> → GRI 404 Training & Education, 413 Local Communities ; IFRS S1-22 Governance & Strategy, S1-20 Human Capital ; Scope 3 supplemental

							(education/learning) ; COSO: Information & Communication / Control Activities
A02-3	Mountain / Beach Cleanup	Convert environmental volunteering into Proof Records; quantify ecological restoration behaviors.	UID: volunteer ; Product ID: cleanup voucher ; SDGS Activity ID: A02-3	NGO/eco group defines cleanup event → issues vouchers → sets start/finish redemption	Participant registers → joins cleanup → redeems at completion → Proof Record generated	Initiators: NGOs, eco groups ; Users: enterprises, schools ; Participants: citizens, students, employees	50 pts • 0.87 → <i>Participants</i> × $50 \times 0.87 \times 0.1 \rightarrow$ GRI 306 Waste, 413 Local Communities, 303 Water ; IFRS S2-24 Resource Management, S2-6 Metrics & Targets ; Scope 3-12 End-of-Life Waste ; COSO: Risk Assessment / Control Activities
A02-4	Public Welfare Run	Transform charity runs into Proof Records; capture health × social × environmental value.	UID: runner ; Product ID: run voucher ; SDGS Activity ID: A02-4	Organizer defines run route → issues vouchers → sets start/finish redemption	Runner checks in via QR → completes run → redeems at finish line → Proof Record generated	Initiators: NGOs, sports federations ; Users: enterprises, schools ; Participants: citizens, students, employees	50 pts • 0.87 → <i>Participants</i> × $50 \times 0.87 \times 0.1 \rightarrow$ GRI 403 Occupational Health & Safety, 413 Local Communities, 305 Emissions ; IFRS S1-20 Human Capital, S2-6 Metrics & Targets, S2 Transition Planning ; Scope 3-6 Business Travel, 3-9 Downstream Transportation ; COSO: Control Environment / Risk Assessment / Control Activities / Monitoring
A03-1	ESG Campus Mapping	Convert campus ESG-related facilities (energy, waste, commuting) into visible Proof Records.	UID: student/staff ; Product ID: campus map ; SDGS Activity ID: A03-1	School uploads ESG map	Students/staff interact with campus map → Proof generated	Initiators: schools ; Users: students, teachers ; Participants: community	20 pts • 0.80 → GRI 302, 305, 413 ; IFRS S2-6, S1-22 ; Scope 3-7 Commuting ; COSO: Info & Communication / Control Activities
A03-2	One-Day Low- Carbon Challenge	Engage students in a one-day low- carbon lifestyle (waste reduction, commuting choices) with verifiable Proof Records.	UID: student ; Product ID: low- carbon day ; SDGS Activity ID: A03-2	School sets challenge	Students record low- carbon actions → Proof generated	Initiators: schools ; Users: enterprises, gov. ; Participants: students	30 pts • 0.87 → GRI 305, 306, 302 ; IFRS S2-13, S2-14 ; Scope 3- 12 Waste, 3-7 Commuting ; COSO: Control Environment / Risk Assessment

A03-3	Sustainability Hiking	Turn campus hiking/eco-walk events into ESG Proof Records linked to health, commuting, and community impact.	UID: student ; Product ID: eco-hiking ; SDGS Activity ID: A03-3	School/club uploads event	Students join hike → Proof generated	Initiators: schools, NGOs ; Users: enterprises ; Participants: students, citizens	50 pts • 0.87 → GRI 403, 305, 413 ; IFRS S1-20, S2-6 ; Scope 3-6 Business Travel, 3-9 Transport ; COSO: Control Environment / Monitoring
A03-4	Green Life Proposal	Encourage students to submit proposals on sustainability initiatives, recorded as Proof Records.	UID: student ; Product ID: proposal ; SDGS Activity ID: A03-4	Students submit proposal	School reviews → Proof generated	Initiators: schools ; Users: teachers, NGOs ; Participants: students	20 pts • 0.80 → GRI 404, 413, 102 ; IFRS S1-22, S1-29 ; Scope 3 (education/governance) ; COSO: Info & Communication / Monitoring
A04-1	ESG Learning Task	Transform ESG courses into Proof Records; employee learning becomes verifiable ESG data.	UID: employee ; Product ID: training voucher ; SDGS Activity ID: A04-1	HR/ESG unit defines course → uploads training task → issues vouchers	Employee registers → attends ESG course → redeems voucher → Proof Record generated	Initiators: HR, ESG departments ; Users: listed companies, enterprises ; Participants: employees	20 pts • 0.80 → GRI 404 Training & Education, 403 OH&S ; IFRS S1-20 Human Capital, S1-22 Governance ; Scope 3 supplemental (training/education) ; COSO: Control Environment / Info & Communication
A04-2	Volunteer Service Task	Convert volunteer service into Proof Records; employee social engagement becomes measurable ESG contribution.	UID: employee ; Product ID: volunteer voucher ; SDGS Activity ID: A04-2	CSR/HR unit organizes service event → issues vouchers	Employee joins service activity → redeems voucher after completion → Proof Record generated	Initiators: CSR, HR teams ; Users: listed companies, NGOs ; Participants: employees	30 pts • 0.87 → GRI 413 Local Communities, 403 OH&S ; IFRS S1-29 Social Responsibility ; Scope 3-7 Employee Commuting (volunteer participation) ; COSO: Control Activities / Monitoring
A04-3	Safety Drill Task	Turn participation in safety drills into Proof Records; strengthen OH&S reporting with verifiable employee data.	UID: employee ; Product ID: drill voucher ; SDGS Activity ID: A04-3	Safety/HR unit defines drill → uploads task → issues vouchers	Employee participates in drill → scans voucher at start & finish → Proof Record generated	Initiators: HR, Safety departments ; Users: listed companies, enterprises ; Participants: employees	30 pts • 0.80 → GRI 403 OH&S, 102 Governance ; IFRS S1-22 Governance & Strategy, S1-20 Human Capital ; Scope 3 supplemental (emergency/safety training) ; COSO: Risk Assessment / Control Activities

A04-4	Case Study Task	Transform ESG case study participation into Proof Records; strengthen governance learning with verified engagement.	UID: employee ; Product ID: case study voucher ; SDGS Activity ID: A04-4	HR/ESG unit organizes case study → uploads task → issues vouchers	Employee participates in case study → redeems voucher at completion → Proof Record generated	Initiators: HR, ESG departments ; Users: listed companies, enterprises ; Participants: employees	20 pts • 0.73 → GRI 404 Training & Education, 102 Stakeholder Engagement ; IFRS S1-22 Governance, S1-29 Social Responsibility ; Scope 3 supplemental (governance/education) ; COSO: Info & Communication / Monitoring
A05-1	Automated Meeting Scheduling	Transform automated scheduling into Proof Records; quantify efficiency gains in energy and emission reduction.	UID: employee ; Product ID: meeting voucher ; SDGS Activity ID: A05-1	IT/HR defines scheduling automation → uploads task → issues vouchers	Employee uses digital scheduling tool → redeem voucher → Proof Record generated	Initiators: IT, HR units ; Users: listed companies, tech firms ; Participants: employees	20 pts • 0.73 → GRI 302 Energy, 305 Emissions ; IFRS S2-6 Metrics & Targets, S1-22 Governance ; Scope 3-6 Business Travel, 3-7 Commuting ; COSO: Control Activities / Info & Communication
A05-2	Digital Meeting Task Assignment	Convert digital task assignment into Proof Records; demonstrate reduced waste and travel substitution.	UID: employee ; Product ID: digital meeting voucher ; SDGS Activity ID: A05-2	HR/ESG defines meeting tasks → issues vouchers	Employee accepts task assignment → completes meeting digitally → redeems voucher → Proof Record generated	Initiators: HR, ESG units ; Users: listed companies, enterprises ; Participants: employees	30 pts • 0.80 → GRI 404 Training, 302 Energy ; IFRS S1-20 Human Capital, S1-22 Governance ; Scope 3-6 Business Travel (substitution), 3-12 Waste ; COSO: Control Environment / Risk Assessment
A05-3	Collaborative Co-creation Data	Make collaborative digital work measurable; Proof Records reflect shared governance and reduced travel demand.	UID: employee ; Product ID: collaboration voucher ; SDGS Activity ID: A05-3	Enterprise defines co-creation activity → issues vouchers	Employee participates in collaborative session → redeems voucher → Proof Record generated	Initiators: ESG, HR units ; Users: listed companies, enterprises ; Participants: employees	20 pts • 0.87 → GRI 404 Training, 413 Local Communities ; IFRS S1-22 Governance & Strategy, S1-29 Social Responsibility ; Scope 3 supplemental (collaboration & travel reduction) ; COSO: Info & Communication / Monitoring
A05-4	Emission Reduction Action Verification	Turn emission-reduction actions into Proof Records; validate sustainability	UID: employee Product ID: emission-reduction voucher SDGS Activity ID: A05-4	ESG/IT defines reduction tasks → uploads mission → issues vouchers	Employee completes digital reduction action → redeems voucher → Proof Record generated	Initiators: IT, ESG units ; Users: listed companies, tech firms ; Participants: employees	50 pts • 0.87 → GRI 305 Emissions, 302 Energy ; IFRS S2-6 Metrics & Targets, S2-24 Resource Management ; Scope 3-6 Business Travel, 3-7 Commuting ; COSO:

		<i>impact of digital-first operations.</i>					Risk Assessment / Control Activities / Monitoring
A06-1	Remote Work Reporting	<i>Turn remote work declarations into Proof Records; quantify energy/emission savings via reduced commuting.</i>	UID: employee ; Product ID: remote-work voucher ; SDGS Activity ID: A06-1	HR/ESG defines reporting format → uploads task → issues vouchers	Employee submits remote work declaration → redeems voucher → Proof Record generated	Initiators: HR, ESG units ; Users: listed companies, enterprises ; Participants: employees	20 pts • 0.80 → GRI 302 Energy, 305 Emissions, 404 Training ; IFRS S1-20 Human Capital, S2-6 Metrics & Targets ; Scope 3-7 Employee Commuting (substitution) ; COSO: Control Activities / Monitoring
A06-2	Remote Work Log	<i>Digitize remote work logs as Proof Records; demonstrate reduced business travel and waste through digital workflows.</i>	UID: employee ; Product ID: work-log voucher ; SDGS Activity ID: A06-2	HR/ESG defines digital log system → uploads task → issues vouchers	Employee records daily log → uploads entry → redeems voucher → Proof Record generated	Initiators: HR, ESG units ; Users: listed companies, enterprises ; Participants: employees	20 pts • 0.80 → GRI 404 Training, 306 Waste ; IFRS S1-22 Governance, S1-29 Social Responsibility ; Scope 3-6 Business Travel (substitution) ; COSO: Info & Communication / Monitoring
A06-3	Attendance Verification	<i>Convert remote attendance checks into Proof Records; ensure employee accountability and commuting reduction are measurable.</i>	UID: employee ; Product ID: attendance voucher ; SDGS Activity ID: A06-3	HR defines attendance check system → uploads task → issues vouchers	Employee checks in remotely → attendance verified → redeems voucher → Proof Record generated	Initiators: HR units ; Users: listed companies, enterprises ; Participants: employees	30 pts • 0.80 → GRI 401 Employment, 403 OH&S ; IFRS S1-20 Human Capital, S1-22 Governance ; Scope 3-7 Employee Commuting (reduction) ; COSO: Control Environment / Risk Assessment
A06-4	Emission Reduction Summary	<i>Aggregate employee commuting and business travel reductions into Proof Records; validate organizational-</i>	UID: employee ; Product ID: reduction voucher ; SDGS Activity ID: A06-4	ESG/HR defines emission summary process → uploads task → issues vouchers	Employees submit commuting/travel reduction data → system aggregates → Proof Record generated	Initiators: HR, ESG units ; Users: listed companies, enterprises ; Participants: employees	50 pts • 0.87 → GRI 305 Emissions, 302 Energy ; IFRS S2-6 Metrics & Targets, S2-4 Resource Management ; Scope 3-6 Business Travel, 3-7 Commuting ; COSO: Risk Assessment / Control Activities / Monitoring

		level carbon savings.					
A07-1	Travel Request Submission	Turn travel requests into Proof Records; quantify potential carbon impact before business trips occur.	UID: employee Product ID: travel request voucherSDGS Activity ID: A07-1	HR/Finance defines approval workflow → uploads task → issues vouchers	Employee submits travel request digitally → system logs approval → Proof Record generated	Initiators: HR, Finance Users: listed companies, enterprises Participants: employees	20 pts • 0.73 → GRI 302 Energy, 305 Emissions ; IFRS S2-6 Metrics & Targets, S1-22 Governance ; Scope 3-6 Business Travel ; COSO: Control Activities / Info & Communication
A07-2	Travel Receipt Logging	Capture receipts and invoices as Proof Records; ensure business travel data contributes to carbon disclosure.	UID: employee ; Product ID: receipt voucher ; SDGS Activity ID: A07-2	Finance/HR defines submission system → uploads task → issues vouchers	Employee uploads travel receipts → system validates → Proof Record generated	Initiators: HR, Finance ; Users: listed companies, enterprises ; Participants: employees	30 pts • 0.80 → GRI 305 Emissions, 401 Employment ; IFRS S1-20 Human Capital, S1-29 Social Responsibility ; Scope 3-6 Business Travel ; COSO: Control Environment / Risk Assessment
A07-3	Itinerary Completion Verification	Ensure itinerary completion and reporting become measurable Proof Records; integrate safety and emission metrics.	UID: employee ; Product ID: itinerary voucher ; SDGS Activity ID: A07-3	HR/ESG defines verification process → uploads task → issues vouchers	Employee completes trip → submits itinerary report → Proof Record generated	Initiators: HR, ESG units ; Users: listed companies, enterprises ; Participants: employees	30 pts • 0.87 → GRI 305 Emissions, 302 Energy, 403 OH&S ; IFRS S2-14 Resource Management, S2-6 Metrics & Targets ; Scope 3-6 Business Travel ; COSO: Control Activities / Monitoring
A07-4	Expense Reimbursement Verification	Turn reimbursement approvals into Proof Records; validate both financial and carbon accountability of travel.	UID: employee ; Product ID: reimbursement voucher ; SDGS Activity ID: A07-4	Finance/HR defines reimbursement process → uploads task → issues vouchers	Employee submits reimbursement → system validates cost & emission data → Proof Record generated	Initiators: HR, Finance ; Users: listed companies, enterprises ; Participants: employees	50 pts • 0.87 → GRI 201 Economic Performance, 305 Emissions, 302 Energy ; IFRS S1-22 Governance & Strategy, S2-6 Metrics & Targets ; Scope 3-6 Business Travel ; COSO: Risk Assessment / Control Activities / Monitoring

A08-1	Low-Carbon Meal Ordering	<i>Turn meal choices into Proof Records; measure carbon footprint of dining selections.</i>	UID: employee ; Product ID: meal voucher ; SDGS Activity ID:A08-1	ESG/canteen defines low-carbon menu → uploads task	Employee orders low-carbon meal → system logs → Proof Record generated	Initiators: ESG/HR ; Users: enterprises, schools ; Participants: employees, students	20 pts • 0.80 → GRI 305, 302 ; IFRS S2-13 ; Scope 3-1, 3-12 ; COSO: Control Activities / Monitoring
A08-2	Green Dining Survey	<i>Record survey participation as Proof Records; promote governance and education for sustainable dining.</i>	UID: employee ; Product ID: survey voucher ; SDGS Activity ID: A08-2	HR/ESG defines survey → uploads task	Employee completes survey → redeem voucher → Proof Record generated	Initiators: HR/ESG ; Users: enterprises, schools ; Participants: employees, students	20 pts • 0.80 → GRI 404, 413 ; IFRS S1-22 ; Scope 3 supplemental ; COSO: Info & Communication / Monitoring
A08-3	Reusable Utensils Challenge	<i>Capture employee use of reusable utensils as verifiable Proof Records.</i>	UID: employeePr ; t ID: utensil voucher ; SDGS Activity ID: A08-3	HR/ESG defines program → uploads task	Employee brings reusable utensils → scans voucher → Proof Record generated	Initiators: ESG teams ; Users: enterprises, schools ; Participants: employees, students	30 pts • 0.87 → GRI 301, 306 ; IFRS S2-14 ; Scope 3-12 ; COSO: Risk Assessment / Control Activities
A08-4	No-Waste Meal Challenge	<i>Convert full-meal completion into Proof Records; quantify food waste reduction.</i>	UID: employee ; Product ID: no-waste voucher ; SDGS Activity ID: A08-4	Canteen/HR defines challenge → uploads task	Employee finishes meal without waste → logs voucher → Proof Record generated	Initiators: HR, canteens ; Users: enterprises, schools ; Participants: employees, students	20 pts • 0.87 → GRI 306, 305 ; IFRS S2-6 ; Scope 3-12 ; COSO: Control Environment / Monitoring
A08-5	Vegetarian Challenge	<i>Measure adoption of vegetarian meals; link dietary changes to reduced carbon emissions.</i>	UID: employee ; Product ID: vegetarian voucher ; SDGS Activity ID: A08-5	ESG/canteen defines vegetarian program → uploads task	Employee orders vegetarian meal → redeem voucher → Proof Record generated	Initiators: ESG/canteens ; Users: enterprises, schools ; Participants: employees, students	30 pts • 0.80 → GRI 306, 413 ; IFRS S1-29 ; Scope 3-12 ; COSO: Risk Assessment / Control Activities
A08-6	Healthy Veggie Day	<i>Track healthy meal days as Proof Records; integrate into corporate health and ESG reporting.</i>	UID: employee ; Product ID: health voucher ; SDGS Activity ID: A08-6	HR/ESG defines program → uploads task	Employee chooses healthy veggie meal → logs voucher → Proof Record generated	Initiators: HR, ESG ; Users: enterprises, schools ; Participants: employees, students	20 pts • 0.80 → GRI 403, 404 ; IFRS S1-20 ; Scope 3 supplemental ; COSO: Control Environment / Info & Communication

A08-7	Sugar-Free Beverage Day	<i>Encourage sugar-free drinks as Proof Records; measure positive health outcomes.</i>	UID: employee ; Product ID: drink voucher ; SDGS Activity ID: A08-7	Canteen/HR defines beverage program → uploads task	Employee selects sugar-free drink → scans voucher → Proof Record generated	Initiators: HR, canteens ; Users: enterprises, schools ; Participants: employees, students	20 pts • 0.73 → GRI 403, 305 ; IFRS S1-20 ; Scope 3 supplemental ; COSO: Risk Assessment / Monitoring
A08-8	Food & Agriculture Education	<i>Transform agri-food education into Proof Records; connect to waste reduction and responsible sourcing.</i>	UID: employee ; Product ID: education voucher ; SDGS Activity ID: A08-8	ESG/education units define program → uploads task	Employee participates in education session → logs voucher → Proof Record generated	Initiators: ESG, schools ; Users: enterprises, schools ; Participants: employees, students	30 pts • 0.80 → GRI 413, 404 ; IFRS S1-29 ; Scope 3-1, 3-12 ; COSO: Control Activities / Monitoring
A08-9	Shared Meal with Friends	<i>Record social dining activities as Proof Records; link to community engagement and social responsibility.</i>	UID: employee ; Product ID: shared-meal voucher ; SDGS Activity ID: A08-9	ESG/CSR defines activity → uploads task	Employee dines with colleagues/friends → logs voucher → Proof Record generated	Initiators: HR, CSR ; Users: enterprises, schools ; Participants: employees, students	20 pts • 0.80 → GRI 413, 102 ; IFRS S1-29 ; Scope 3 supplemental ; COSO: Control Environment / Info & Communication
A08-10	Agricultural Education Experience	<i>Turn farm-to-table learning into Proof Records; connect sustainability education to ESG disclosure.</i>	UID: employee ; Product ID: agri-edu voucher ; SDGS Activity ID: A08-10	ESG/education units define program → uploads task	Employee joins agricultural experience → redeem voucher → Proof Record generated	Initiators: schools, ESG teams ; Users: enterprises, schools ; Participants: employees, students	30 pts • 0.87 → GRI 404, 413 ; IFRS S1-20, S1-22 ; Scope 3 supplemental ; COSO: Info & Communication / Monitoring
A08-11	Brand Dialogue	<i>Use brand-to-consumer dialogues as Proof Records; improve governance transparency.</i>	UID: employee ; Product ID: brand-dialogue voucher ; SDGS Activity ID: A08-11	Brand/ESG unit defines dialogue → uploads task	Employees/customer s join session → redeem voucher → Proof Record generated	Initiators: brand units ; Users: listed companies, enterprises ; Participants: employees, consumers	20 pts • 0.73 → GRI 102, 413 ; IFRS S1-22 ; Scope 3 supplemental ; COSO: Info & Communication / Monitoring
A08-12	Food Bank Volunteering	<i>Record food bank volunteering as Proof Records; integrate CSR into carbon and waste disclosure.</i>	UID: employee ; Product ID: food-bank voucher ; SDGS Activity ID: A08-12	CSR/NGO defines volunteering event → uploads task	Employee joins food bank service → logs voucher → Proof Record generated	Initiators: CSR, NGOs ; Users: listed companies, schools ; Participants: employees, students	50 pts • 0.87 → GRI 413, 306 ; IFRS S1-29 ; Scope 3-12 ; COSO: Control Environment / Monitoring

A09-1	Health Screening Task	Convert health checks into Proof Records; ensure medical data contributes to ESG reporting.	UID: employee ; Product ID: health-check voucher ; SDGS Activity ID: A09-1	HR/EHS defines health check program → uploads task	Employee completes screening → uploads result → Proof Record generated	Initiators: HR, EHS ; Users: listed companies, enterprises ; Participants: employees	30 pts • 0.87 → GRI 403 OH&S, 401 Employment ; IFRS S1-20, S1-29 ; Scope 3 supplemental (health data) ; COSO: Control Environment / Monitoring
A09-2	Exercise Challenge Task	Make fitness participation measurable; link exercise programs to reduced commuting emissions and health benefits.	UID: employee ; Product ID: exercise voucher ; SDGS Activity ID: A09-2	HR/ESG defines challenge program → uploads task	Employee participates in exercise activity → scans voucher → Proof Record generated	Initiators: HR, ESG ; Users: listed companies, communities ; Participants: employees	50 pts • 0.87 → GRI 403 OH&S, 413 Communities ; IFRS S1-20, S2-6 ; Scope 3-7 Employee Commuting (extended), supplemental (health improvement) ; COSO: Control Activities / Monitoring
A09-3	Health Promotion Task	Transform wellness campaigns into Proof Records; measure educational and behavioral change impact.	UID: employee ; Product ID: wellness-promo voucher SDGS Activity ID: A09-3	HR/ESG defines awareness campaign → uploads task	Employee joins campaign → logs voucher → Proof Record generated	Initiators: HR, ESG Users: enterprises, schools Participants: employees	20 pts • 0.80 → GRI 404 Training, 403 OH&S ; IFRS S1-20, S1-22 ; Scope 3 supplemental (education/health) ; COSO: Info & Communication / Control Activities
A09-4	Health Tracking Task	Quantify continuous health monitoring as Proof Records; integrate long-term data into ESG disclosures.	UID: employee ; Product ID: health-tracking voucher ; SDGS Activity ID: A09-4	HR/ESG defines health tracking → uploads task	Employee logs health indicators → submits data → Proof Record generated	Initiators: HR, ESG ; Users: enterprises, insurers ; Participants: employees	30 pts • 0.80 → GRI 403 OH&S, 401 Employment ; IFRS S1-20, S1-29 ; Scope 3 supplemental (continuous health data) ; COSO: Risk Assessment / Monitoring
A10-1	Low-Carbon Packaging Task	Turn sustainable packaging adoption into Proof Records; quantify material efficiency and waste reduction.	UID: employee/custom er ; Product ID: packaging voucher ; SDGS Activity ID: A10-1	E-commerce/logistics defines packaging policy → uploads task	Customer/employee chooses low-carbon packaging → logs voucher → Proof Record generated	Initiators: logistics teams, e-commerce ; Users: platforms, enterprises ; Participants: employees, customers	30 pts • 0.87 → GRI 301, 306, 305 ; IFRS S2-14 ; Scope 3-1, 3-12 ; COSO: Risk Assessment / Control Activities

A10-2	Smart Pickup Task	Quantify low-emission pickup methods as Proof Records; link logistics choices to reduced waste and transport energy.	UID: employee/customer Product ID: pickup voucher SDGS Activity ID: A10-2	Logistics defines pickup program → uploads task	Customer/employee uses designated pickup point → logs voucher → Proof Record generated	Initiators: logistics teams Users: e-commerce, enterprises Participants: employees, customers	20 pts • 0.80 → GRI 302, 305 ; IFRS S2-6 ; Scope 3-9, 3-12 ; COSO: Control Environment / Info & Communication
A10-3	Delivery Distance Task	Capture delivery mileage into Proof Records; ensure transportation emissions are measurable.	UID: logistics ; Product ID: delivery voucher ; SDGS Activity ID: A10-3	Logistics defines mileage-reporting system → uploads task	Delivery staff logs mileage → system validates → Proof Record generated	Initiators: logistics teams ; Users: e-commerce, enterprises ; Participants: employees, logistics partners	30 pts • 0.87 → GRI 305, 302 ; IFRS S2-6 ; Scope 3-4, 3-9 ; COSO: Control Activities / Monitoring
A10-4	Circular Recycling Task	Make recycling activities measurable as Proof Records; integrate material recovery into ESG disclosures.	UID: employee/customer ; Product ID: recycling voucher ; SDGS Activity ID: A10-4	Logistics/ESG defines recycling program → uploads task	Customer/employee returns materials for recycling → logs voucher → Proof Record generated	Initiators: logistics, ESG ; Users: e-commerce, enterprises ; Participants: employees, customers	50 pts • 0.87 → GRI 306, 301, 413 ; IFRS S1-29, S2-14 ; Scope 3-12 ; COSO: Control Environment / Monitoring
A11-1	Green Ticket Task	Turn eco-ticketing into Proof Records; quantify low-carbon commuting and business travel impact.	UID: employee/customer ; Product ID: green ticket voucher ; SDGS Activity ID: A11-1	Event organizer defines green ticket rules → uploads task	Participant purchases/uses eco-ticket → logs voucher → Proof Record generated	Initiators: event organizers ; Users: enterprises, cultural institutions ; Participants: employees, customers	20 pts • 0.87 → GRI 305, 302, 306, 413 ; IFRS S2-6 ; Scope 3-6, 3-7, 3-9 ; COSO: Control Env / Risk Assessment / Control Activities
A11-2	Low-Carbon Activity Experience Task	Capture low-carbon participation (waste reduction, low-emission behaviors) as Proof Records.	UID: employee/customer ; Product ID: eco-experience voucher ; SDGS Activity ID: A11-2	Organizer defines eco-activity → uploads task	Participant joins activity → logs voucher → Proof Record generated	Initiators: event organizers ; Users: enterprises, cultural institutions ; Participants: employees, citizens	30 pts • 0.80 → GRI 305, 306, 404 ; IFRS S2-13, S2-14 ; Scope 3-12 ; COSO: Risk Assessment / Control Activities

A11-3	Cultural Participation Task	<i>Make cultural engagement measurable; turn community participation into ESG-aligned Proof Records.</i>	UID: employee/customer ; Product ID: culture voucher ; SDGS Activity ID: A11-3	Organizer defines cultural program → uploads task	Participant attends activity → logs voucher → Proof Record generated	Initiators: cultural orgs ; Users: enterprises, schools ; Participants: employees, citizens	20 pts • 0.80 → GRI 413, 102, 404 ; IFRS S1-29, S1-22 ; Scope 3 supplemental disclosure (community/education) ; COSO: Info & Communication / Monitoring
A11-4	Post-Event Feedback Task	<i>Transform post-event surveys into Proof Records; ensure feedback supports governance and education disclosures.</i>	UID: employee/customer ; Product ID: feedback voucher ; SDGS Activity ID: A11-4	Organizer defines survey → uploads task	Participant submits feedback → logs voucher → Proof Record generated	Initiators: event organizers ; Users: enterprises, schools ; Participants: employees, citizens	30 pts • 0.80 → GRI 404, 413 ; IFRS S1-20, S1-22 ; Scope 3 supplemental disclosure (education/governance) ; COSO: Info & Communication / Monitoring
A12-1	Check-in Registration Task	<i>Turn hotel check-ins into Proof Records; capture low-carbon accommodation data.</i>	UID: traveler ; Product ID: hotel check-in voucher ; SDGS Activity ID: A12-1	Hotel defines task → uploads	Guest checks in → logs voucher → Proof Record	Initiators: hotels ; Users: enterprises, event organizers ; Participants: travelers	20 pts • 0.73 → GRI 302, 305 ; IFRS S2-6, S1-22 ; Scope 3-6 Business Travel ; COSO: Control Activities / Info & Communication
A12-2	Green Room Proof	<i>Quantify impact of eco-friendly rooms (energy/water reduction) as verifiable Proof Records.</i>	UID: traveler ; Product ID: green room voucher ; SDGS Activity ID: A12-2	Hotel defines eco-room criteria → uploads	Guest stays in green room → logs Proof	Initiators: hotels ; Users: enterprises ; Participants: travelers	30 pts • 0.87 → GRI 302, 303, 305 ; IFRS S2-14, S2-6 ; Scope 3-6 Business Travel ; COSO: Risk Assessment / Control Activities
A12-3	Energy-saving Record Task	<i>Capture and disclose measurable energy savings during hotel stays.</i>	UID: traveler ; Product ID: energy-saving voucher ; SDGS Activity ID: A12-3	Hotel defines saving measures → uploads	Guest follows eco-usage rules → Proof Record generated	Initiators: hotels ; Users: enterprises ; Participants: travelers	30 pts • 0.87 → GRI 302, 305 ; IFRS S2-13, S2-14 ; Scope 3-6 Business Travel ; COSO: Monitoring / Control Activities
A12-4	Environmental Participation Proof	<i>Enable travelers to join sustainability programs (waste sorting, community</i>	UID: traveler ; Product ID: eco-participation voucher ; SDGS Activity ID: A12-4	Hotel defines environmental activities → uploads	Guest participates in activity → logs Proof	Initiators: hotels, event organizers ; Users: enterprises ; Participants: travelers, citizens	50 pts • 0.87 → GRI 306, 413, 404 ; IFRS S1-29, S1-20 ; Scope 3-12 Waste, Scope 3-6 Business Travel ; COSO: Control Env / Monitoring

		<i>service) and log Proof Records.</i>					
A13-1	Rental Registration Task	<i>Turn every EV rental record into Proof Records, capturing baseline travel data.</i>	UID: renter ; Product ID: EV rental voucher ; SDGS Activity ID: A13-1	Rental platform uploads records	Traveler rents EV → Proof generated	Initiators: rental companies ; Users: enterprises, event organizers ; Participants: travelers	20 pts • 0.73 → GRI 302, 305 ; IFRS S2-6, S1-22 ; Scope 3-9 Transportation ; COSO: Control Activities / Info & Communication
A13-2	Driving Mileage Task	<i>Record actual driving mileage of EVs, providing measurable emission data.</i>	UID: renter ; Product ID: mileage record ; SDGS Activity ID: A13-2	System logs mileage → uploads	Traveler completes trip → mileage Proof created	Initiators: rental companies ; Users: enterprises ; Participants: travelers	30 pts • 0.87 → GRI 305, 302 ; IFRS S2-13, S2-14 ; Scope 3-9 Transportation ; COSO: Risk Assessment / Monitoring
A13-3	Charging Record Task	<i>Capture EV charging sessions as Proof Records, including energy source and infrastructure data.</i>	UID: renter ; Product ID: charging record ; SDGS Activity ID: A13-3	Charging station uploads data → linked with rental ID	Traveler charges EV → Proof generated	Initiators: charging providers, rental companies ; Users: enterprises ; Participants: travelers	30 pts • 0.8 → GRI 302, 305, 303 ; IFRS S2-14 ; Scope 3-9 Transportation ; COSO: Control Activities / Monitoring
A13-4	Return Verification Task	<i>Verify vehicle return conditions (clean energy, waste disposal, community impact).</i>	UID: renter ; Product ID: return verification ; SDGS Activity ID: A13-4	Rental company sets verification criteria → uploads	Traveler returns EV → Proof generated	Initiators: rental companies ; Users: enterprises, regulators ; Participants: travelers, auditors	50 pts • 0.87 → GRI 305, 302, 413 ; IFRS S1-29, S2-6 ; Scope 3-9 Transportation ; COSO: Control Environment / Monitoring
A14-1	Passenger Check-in Task	<i>Convert every passenger boarding into Proof Records, creating data for public transit usage.</i>	UID: commuter ; Product ID: transport check-in ; SDGS Activity ID: A14-1	Transport operator uploads boarding record	Commuter checks in → Proof generated	Initiators: transport companies ; Users: enterprises, schools ; Participants: employees, students	20 pts • 0.73 → GRI 305, 302 ; IFRS S2-6, S1-22 ; Scope 3-7 Commuting, 3-9 Downstream Transport ; COSO: Control Activities / Info & Communication

A14-2	Commuting Log Task	<i>Track commuting frequency and modes, turning daily transit into ESG-relevant commuting data.</i>	UID: commuter ; Product ID: commuting log ; SDGS Activity ID: A14-2	System records commuting log	Employees/students log trip → Proof generated	Initiators: employers, schools ; Users: enterprises ; Participants: commuters	30 pts • 0.80 → GRI 305, 403 ; IFRS S1-20, S2-6 ; Scope 3-7 Commuting ; COSO: Control Environment / Monitoring
A14-3	Ticket Verification Task	<i>Verify tickets or digital passes, embedding waste reduction and energy efficiency metrics.</i>	UID: commuter ; Product ID: ticket proof ; SDGS Activity ID: A14-3	Ticketing system uploads data	Passenger uses ticket → Proof generated	Initiators: ticketing platforms ; Users: enterprises, schools ; Participants: commuters	20 pts • 0.87 → GRI 302, 305, 306 ; IFRS S2-13 ; Scope 3-7 Commuting, 3-9 Transport ; COSO: Control Activities / Risk Assessment
A14-4	Shared Transport Rental Task	<i>Document shared rides (bike, scooter, carpool) as verifiable Proof Records for Scope 3 data.</i>	UID: user ; Product ID: shared transport ; SDGS Activity ID: A14-4	Rental/sharing operator uploads data	Traveler completes shared ride → Proof generated	Initiators: sharing companies ; Users: enterprises, local governments ; Participants: commuters, citizens	50 pts • 0.87 → GRI 305, 302, 413 ; IFRS S2-14, S2-6 ; Scope 3-9 Transport ; COSO: Control Environment / Monitoring
A15-1	Sustainability Event Promotion	<i>Promote sustainability-themed events and record participation as verifiable Proof Records.</i>	UID: community ; Product ID: event promo ; SDGS Activity ID: A15-1	Organizer uploads event details	Citizens/participants join events → Proof generated	Initiators: NGOs, schools ; Users: enterprises, local gov. ; Participants: citizens	20 pts • 0.80 → GRI 404, 413 ; IFRS S1-20, S1-29 ; Scope 3 (education/engagement) ; COSO: Info & Communication / Monitoring
A15-2	Resident Interaction Task	<i>Transform community workshops, townhalls, and resident engagement into ESG data.</i>	UID: community ; Product ID: resident interaction ; SDGS Activity ID: A15-2	Community group uploads interaction record	Residents participate → Proof generated	Initiators: local gov., CSR depts ; Users: enterprises ; Participants: residents	30 pts • 0.87 → GRI 413, 102 ; IFRS S1-29, S1-22 ; Scope 3 (community interaction) ; COSO: Control Environment / Monitoring
A15-3	Green Declaration Task	<i>Encourage residents or employees to sign green pledges, generating</i>	UID: citizen ; Product ID: pledge ; SDGS Activity ID: A15-3	Platform collects digital pledges	Individuals make pledges → Proof generated	Initiators: enterprises, schools ; Users: NGOs, gov. ; Participants: citizens, employees	20 pts • 0.80 → GRI 305, 413 ; IFRS S2-6, S1-22 ; Scope 3-12 Waste + advocacy ; COSO: Risk Assessment / Control Activities

		<i>behavioral Proof Records.</i>					
A15-4	Sustainability Results Presentation	<i>Publish sustainability outcomes, such as annual reports or community results-sharing.</i>	UID: community ; Product ID: results ; SDGS Activity ID: A15-4	Entity uploads sustainability report	Community/public consumes info → Proof generated	Initiators: enterprises, gov. agencies ; Users: NGOs, schools ; Participants: stakeholders	50 pts • 0.87 → GRI 102, 413 ; IFRS S1-22, S1-29 ; Scope 3 (results/engagement) ; COSO: Control Environment / Info & Comm / Monitoring
A16-1	Green Service Upgrade Task	<i>Embed energy-efficient or safety-related upgrades into service processes, converting them into Proof Records.</i>	UID: service ; Product ID: upgrade ; SDGS Activity ID: A16-1	Service provider uploads upgrade data	Customers/employees use upgraded service → Proof generated	Initiators: service providers ; Users: enterprises ; Participants: employees, customers	30 pts • 0.80 → GRI 302, 416 ; IFRS S2 ; Scope 3-6 Business Travel, 3-7 Commuting ; COSO: Control Activities / Risk Assessment
A16-2	Customer Feedback Task	<i>Capture customer safety and labeling feedback as ESG-relevant Proof Records.</i>	UID: customer ; Product ID: feedback ; SDGS Activity ID: A16-2	Company uploads survey results	Customers provide feedback → Proof generated	Initiators: enterprises, retailers ; Users: schools, NGOs ; Participants: customers	30 pts • 0.73 → GRI 416, 417 ; IFRS S1 (general) ; Scope 3-12 Other Downstream Emissions ; COSO: Monitoring (Feedback Governance)
A16-3	Digital Process Transformation Task	<i>Turn digitalization and paperless transitions into measurable Proof Records for energy efficiency and privacy.</i>	UID: enterprise ; Product ID: digital process ; SDGS Activity ID: A17-3	Enterprise uploads digitalization data	Employees/customer s use digital service → Proof generated	Initiators: enterprises, gov. ; Users: schools, NGOs ; Participants: employees, citizens	50 pts • 0.87 → GRI 302, 418 ; IFRS S2, S1 ; Scope 3-9 Distribution ; COSO: Control Environment / Info & Communication
A16-4	Public Service Challenge Task	<i>Record voluntary participation in public service or community challenges as ESG data.</i>	UID: citizen ; Product ID: public service ; SDGS Activity ID: A17-4	NGO/government uploads service data	Citizens/employees join service → Proof generated	Initiators: NGOs, gov. ; Users: enterprises ; Participants: citizens, employees	30 pts • 0.87 → GRI 413, 401 ; IFRS S1-29, S1 ; Scope 3-12 Other Downstream Emissions ; COSO: Control Activities / Monitoring

Appendix B – Whitelist Core Modules (B01–B14)

Module ID	Module Name	One-Line Narrative
B01	Upstream & Downstream Module	Capture supply chain upstream and downstream activities as verifiable Proof Records.
B02	Green Procurement Module	Ensure procurement practices align with ESG criteria and are traceable for disclosure.
B03	Energy-Efficient Equipment Module	Record deployment and use of energy-efficient equipment as ESG-aligned Proof Records.
B04	Food Supply Chain Module	Track sustainability in food production, processing, and distribution chains.
B05	Green Power Consumption Module	Convert renewable energy usage into Proof Records for Scope 2 and Scope 3 disclosure.
B06	Carbon Audit Collaboration Module	Standardize carbon data collaboration across enterprises for audit readiness.
B07	Supply Chain ESG Verification Module	Proof-log ESG verification results across supplier networks for assurance.
B08	Green Manufacturing Module	Record cleaner production processes and resource efficiency improvements.
B09	Supply Chain Audit Module	Convert audit outcomes into standardized Proof Records for governance.
B10	Water Resource Management Module	Track water usage, recycling, and conservation actions as Proof Records.
B11	Sustainable Finance Products Module	Convert green investments, ESG financing, insurance, and carbon finance into auditable Proof Records.

Module ID	Module Name	One-Line Narrative
B12	Trust & Assurance Insurance Module	Record insurance actions that enhance social resilience and sustainability trust.
B13	Waste Management Module	Track waste treatment, recycling, and disposal actions as ESG data.
B14	Sustainable Finance Governance Module	Embed ESG risk frameworks, green asset policies, and net-zero commitments into Proof Records for institutional governance.

Sub-task ID	Sub-task Name	Headline / Institutional Narrative	Three-ID (UID / Product ID / SDGS Activity ID)	Initiator Flow	Participant Flow	Suggested Initiators / Users / Participants	Mapping (Points • Weight • NTCC) & Standards
B01-1	Supplier Commitment Proof	<i>Turn supplier ESG commitments into Proof Records; ensure upstream sustainability pledges are verifiable.</i>	UID: supplier ; Product ID: commitment voucher ; SDGS Activity ID: B01-1	Enterprise requests supplier ESG commitment → uploads document/voucher	Supplier signs digital commitment → Proof Record generated	Initiators: procurement, ESG units ; Users: listed companies, manufacturers ; Participants: suppliers	150 pts • 0.80 → GRI 308 Supplier Environmental Assessment, 414 Supplier Social Assessment ; IFRS S1-22 Governance ; Scope 3-1 Purchased Goods & Services ; COSO: Control Environment / Risk Assessment
B01-2	Downstream Customer Feedback	<i>Capture downstream customer ESG feedback as Proof Records; integrate buyer voices into disclosure.</i>	UID: customer ; Product ID: feedback voucher ; SDGS Activity ID: B01-2	Enterprise sends ESG survey to customers → uploads feedback channel	Customer submits ESG-related feedback → Proof Record generated	Initiators: sales, ESG units ; Users: enterprises, brands ; Participants: customers, end-users	100 pts • 0.73 → GRI 102 Stakeholder Engagement, 416 Customer Health & Safety ; IFRS S1-29 Social Responsibility ; Scope 3-9 Downstream Transportation ; COSO: Information & Communication / Monitoring
B01-3	Supply Chain Data Disclosure	<i>Transform supplier data (GHG, water, waste) into standardized</i>	UID: supplier ; Product ID: data voucher ; SDGS Activity ID: B01-3	Enterprise requests ESG data disclosure → uploads reporting template	Supplier provides data → verified via voucher → Proof Record generated	Initiators: procurement, ESG units ; Users: listed companies, MNCs ;	200 pts • 0.87 → GRI 305 Emissions, 302 Energy, 303 Water ; IFRS S2-6 Metrics & Targets ; Scope 3-1 Purchased

		<i>Proof Records for ESG reporting.</i>				Participants: suppliers	Goods & Services ; COSO: Control Activities / Monitoring
B01-4	Co-creation Project Collaboration	<i>Record upstream-downstream collaboration projects as Proof Records; highlight joint ESG innovation.</i>	UID: supplier/customer ; Product ID: project voucher ; SDGS Activity ID: B01-4	Enterprise defines joint ESG project → uploads voucher	Supplier & customer participate → milestones logged → Proof Records generated	Initiators: enterprises, supply chain alliances ; Users: listed companies, brands ; Participants: suppliers, customers	150 pts • 0.80 → GRI 102 General Disclosures, 305 Emissions, 413 Local Communities ; IFRS S1-22 Governance, S1-29 Social Responsibility ; Scope 3-1 Upstream, 3-9 Downstream ; COSO: Control Env / Risk Assessment / Monitoring
B02-1	Sustainable Supplier List	<i>Turn the adoption of green supplier lists into Proof Records; ensure procurement integrates ESG criteria.</i>	UID: supplier ; Product ID: list inclusion voucher ; SDGS Activity ID: B02-1	Procurement unit defines green supplier criteria → uploads supplier list	Supplier qualifies & enters list → Proof Record generated	Initiators: procurement, ESG units ; Users: listed companies, manufacturers ; Participants: suppliers	100 pts • 0.80 → GRI 308 Supplier Environmental Assessment, 414 Supplier Social Assessment ; IFRS S1-22 Governance ; Scope 3-1 Purchased Goods & Services ; COSO: Control Environment / Risk Assessment
B02-2	Green Procurement Contract	<i>Capture contract terms embedding ESG clauses as Proof Records; quantify sustainable procurement practices.</i>	UID: supplier ; Product ID: contract voucher ; SDGS Activity ID: B02-2	Legal/procurement defines ESG contract clauses → uploads contracts	Supplier signs ESG contract → Proof Record generated	Initiators: procurement, legal ; Users: listed companies, brands ; Participants: suppliers	150 pts • 0.80 → GRI 102 General Disclosures, 308 Supplier Assessment ; IFRS S1-29 Social Responsibility ; Scope 3-1 Purchased Goods & Services ; COSO: Information & Communication / Control Activities
B02-3	ESG Material Traceability	<i>Ensure material sourcing traceability (GHG, waste, labor) becomes measurable Proof Records.</i>	UID: supplier ; Product ID: traceability voucher ; SDGS Activity ID: B02-3	Procurement requests traceability data → uploads to system	Supplier submits data → validated → Proof Record generated	Initiators: procurement, ESG teams ; Users: listed companies, MNCs ; Participants: suppliers	200 pts • 0.87 → GRI 301 Materials, 305 Emissions ; IFRS S2-6 Metrics & Targets ; Scope 3-1 Purchased Goods & Services ; COSO: Control Activities / Monitoring

B02-4	Procurement Audit	<i>Transform green procurement audits into Proof Records; ensure supplier compliance is transparent.</i>	UID: supplier ; Product ID: audit voucher ; SDGS Activity ID: B02-4	ESG/procurement defines audit plan → uploads audit voucher	Supplier undergoes audit → audit results logged → Proof Record generated	Initiators: procurement, ESG audit teams ; Users: listed companies, brands ; Participants: suppliers	150 pts • 0.87 → GRI 308 Supplier Environmental Assessment, 307 Environmental Compliance ; IFRS S1-22 Governance ; Scope 3-1 Purchased Goods & Services ; COSO: Control Env / Risk Assessment / Monitoring
B03-1	Equipment Registration	<i>Transform energy-saving equipment installation into Proof Records; ensure every asset is logged into ESG systems.</i>	UID: enterprise ; Product ID: equipment voucher ; SDGS Activity ID: B03-1	Enterprise installs new equipment → uploads registration	Equipment registered → Proof Record generated	Initiators: facility, ESG units ; Users: listed companies, manufacturers ; Participants: facility managers	100 pts • 0.80 → GRI 302 Energy ; IFRS S2-6 Metrics & Targets ; Scope 3-2 Capital Goods ; COSO: Control Environment / Info & Communication
B03-2	Efficiency Verification	<i>Quantify equipment efficiency gains as Proof Records; provide verifiable evidence for audits and disclosures.</i>	UID: enterprise ; Product ID: verification voucher ; SDGS Activity ID: B03-2	ESG/facility team defines verification → uploads audit data	Energy savings verified → Proof Record generated	Initiators: ESG, audit units ; Users: enterprises, verification bodies ; Participants: facility managers	150 pts • 0.87 → GRI 302 Energy, 305 Emissions ; IFRS S2-13 Resource Efficiency ; Scope 3-2 Capital Goods ; COSO: Risk Assessment / Control Activities
B03-3	Maintenance Tracking	<i>Turn maintenance records into Proof Records; ensure long-term efficiency of energy-saving devices.</i>	UID: enterprise ; Product ID: maintenance voucher ; SDGS Activity ID: B03-3	Facility team schedules maintenance → uploads record	Maintenance completed → Proof Record generated	Initiators: facility, ESG ; Users: listed companies, SMEs ; Participants: facility managers	100 pts • 0.73 → GRI 302 Energy ; IFRS S2-14 Resource Management ; Scope 3-2 Capital Goods ; COSO: Control Activities / Monitoring
B03-4	Project Audit	<i>Convert third-party audits of energy-saving projects into Proof Records; create reliable disclosure evidence.</i>	UID: verifier ; Product ID: audit voucher ; SDGS Activity ID: B03-4	Enterprise engages verifier → uploads audit process	Verifier conducts audit → logs result → Proof Record generated	Initiators: ESG teams, third-party verifiers ; Users: enterprises, investors ; Participants: auditors	200 pts • 0.87 → GRI 302 Energy, 307 Environmental Compliance ; IFRS S2-6 Metrics & Targets ; Scope 3-2 Capital Goods ; COSO: Control Env / Monitoring

B04-1	Raw Material Traceability	Ensure raw materials are traceable; turn sourcing data into Proof Records for ESG disclosure.	UID: supplierP ; Product ID: traceability voucher ; SDGS Activity ID: B04-1	Procurement requests material traceability → uploads record	Supplier provides traceability data → Proof Record generated	Initiators: procurement, ESG ; Users: food companies, retailers ; Participants: suppliers	100 pts • 0.80 → GRI 301 Materials, 308 Supplier Assessment ; IFRS S2-6 Metrics & Targets ; Scope 3-1 Purchased Goods & Services ; COSO: Control Environment / Info & Communication
B04-2	Cold Chain Transportation	Log cold chain logistics as Proof Records; ensure energy and emission data are included in ESG reporting.	UID: logistics provider ; Product ID: cold chain voucher ; SDGS Activity ID: B04-2	Enterprise requires cold chain data → uploads system log	Logistics submits cold chain records → Proof Record generated	Initiators: logistics, procurement ; Users: food manufacturers, distributors ; Participants: logistics partners	150 pts • 0.87 → GRI 302 Energy, 305 Emissions ; IFRS S2-13 Resource Efficiency ; Scope 3-4 Upstream Transportation ; COSO: Risk Assessment / Control Activities
B04-3	Food Safety Testing	Turn food safety tests into verifiable Proof Records; strengthen governance of supply chain safety.	UID: lab ; Product ID: testing voucher ; SDGS Activity ID: B04-3	Enterprise commissions test → uploads testing records	Laboratory conducts test → logs results → Proof Record generated	Initiators: QA, ESG, labs ; Users: food brands, retailers ; Participants: suppliers, labs	200 pts • 0.93 → GRI 416 Customer Health & Safety, 403 OH&S ; IFRS S1-22 Governance ; Scope 3 supplemental (safety compliance) ; COSO: Control Activities / Monitoring
B04-4	Food Waste Reduction	Quantify food waste reduction initiatives as Proof Records; make results auditable in ESG disclosure.	UID: enterprise ; Product ID: waste voucher ; SDGS Activity ID: B04-4	Enterprise defines waste reduction program → uploads record	Employees/customers join program → Proof Record generated	Initiators: ESG, operations ; Users: food enterprises, schools ; Participants: employees, consumers	150 pts • 0.80 → GRI 306 Waste, 305 Emissions ; IFRS S2-14 Resource Management ; Scope 3-12 End-of-Life Waste ; COSO: Control Env / Monitoring
B05-1	Green Electricity Registration	Turn the act of registering green electricity purchases into Proof Records; provide traceability for ESG disclosure.	UID: enterprise ; Product ID: green power voucher ; SDGS Activity ID: B05-1	Enterprise registers renewable power use → uploads certificate	Registration verified → Proof Record generated	Initiators: ESG, energy managers ; Users: listed companies, manufacturers ; Participants: employees, auditors	100 pts • 0.87 → GRI 302 Energy, 305 Emissions ; IFRS S2-6 Metrics & Targets ; Scope 2 Indirect Energy ; COSO: Control Environment / Info & Communication

B05-2	Green Power Consumption	<i>Capture actual consumption of renewable electricity as Proof Records; make energy transition visible in ESG reporting.</i>	UID: enterprise ; Product ID: consumption voucher ; SDGS Activity ID: B05-2	Energy system logs green power usage → uploads	Enterprise consumes renewable power → Proof Record generated	Initiators: ESG, energy teams ; Users: enterprises, schools ; Participants: staff, students	150 pts • 0.93 → GRI 302 Energy ; IFRS S2-13 Resource Efficiency ; Scope 2 Energy Use ; COSO: Control Activities / Monitoring
B05-3	Renewable Project Participation	<i>Log enterprise participation in renewable projects as Proof Records; strengthen institutional accountability.</i>	UID: enterprise ; Product ID: project voucher ; SDGS Activity ID: B05-3	Enterprise joins renewable project → uploads data	Project participation verified → Proof Record generated	Initiators: ESG, renewable energy partners ; Users: enterprises, industry consortia ; Participants: staff, stakeholders	200 pts • 0.87 → GRI 302 Energy, 305 Emissions ; IFRS S2-14 Resource Management ; Scope 3-3 Fuel & Energy Related Activities ; COSO: Risk Assessment / Control Activities
B05-4	Certificate Verification	<i>Ensure third-party RECs or I-RECs are converted into Proof Records; make green electricity auditable.</i>	UID: verifier ; Product ID: REC voucher ; SDGS Activity ID: B05-4	Enterprise submits certificate → verification body uploads	Verifier confirms authenticity → Proof Record generated	Initiators: third-party verifiers ; Users: enterprises, investors ; Participants: ESG teams, auditors	200 pts • 0.93 → GRI 302 Energy ; IFRS S2-6, S2-14 ; Scope 2, Scope 3-3 ; COSO: Control Env / Monitoring
B06-1	Data Submission	<i>Convert supplier/partner carbon inventory data submissions into verifiable Proof Records.</i>	UID: supplier/partner ; Product ID: data voucher ; SDGS Activity ID: B06-1	Enterprise requests inventory data → uploads template	Supplier/partner submits data → Proof Record generated	Initiators: procurement, ESG ; Users: listed companies, SMEs ; Participants: suppliers, partners	100 pts • 0.80 → GRI 305 Emissions ; IFRS S2-6 Metrics & Targets ; Scope 3-1 Purchased Goods & Services ; COSO: Control Environment / Info & Communication
B06-2	Collaboration Verification	<i>Record collaborative verification of carbon data between upstream and downstream as Proof Records.</i>	UID: enterprise ; Product ID: verification voucher ; SDGS Activity ID: B06-2	Enterprise defines collaboration verification → uploads	Upstream/downstream partners co-verify → Proof Record generated	Initiators: ESG, supply chain partners ; Users: enterprises, brands ; Participants: suppliers, customers	150 pts • 0.87 → GRI 305 Emissions ; IFRS S1-22 Governance ; Scope 3 (shared data validation) ; COSO: Risk Assessment / Control Activities

B06-3	Data Sharing	Ensure shared use of carbon inventory data is logged as Proof Records for institutional transparency.	UID: enterprise ; Product ID: sharing voucher ; SDGS Activity ID: B06-3	Enterprise publishes carbon inventory → uploads sharing records	Partner accesses shared data → Proof Record generated	Initiators: enterprises, industry consortia Users: MNCs, SMEs Participants: suppliers, regulators	150 pts • 0.87 → GRI 305 Emissions, 302 Energy ; IFRS S2-14 Resource Management ; Scope 3 (multi-party disclosure) ; COSO: Information & Communication / Monitoring
B06-4	Results Validation	Convert third-party validation of carbon inventory results into Proof Records; ensure auditability.	UID: verifier ; Product ID: validation voucher ; SDGS Activity ID: B06-4	Enterprise commissions verifier → uploads plan	Verifier validates results → logs outcomes → Proof Record generated	Initiators: ESG, verification bodies ; Users: enterprises, investors ; Participants: auditors	200 pts • 0.93 → GRI 305 Emissions, 307 Environmental Compliance ; IFRS S2-6, S2-14 ; Scope 3 (validated inventory) ; COSO: Control Env / Monitoring
B07-1	Document Submission	Convert supplier ESG documents (policies, certificates) into Proof Records for verifiable disclosures.	UID: supplier ; Product ID: document voucher ; SDGS Activity ID: B07-1	Enterprise requests ESG documents → uploads record	Supplier submits documents → Proof Record generated	Initiators: procurement, ESG ; Users: listed companies, brands ; Participants: suppliers	100 pts • 0.80 → GRI 102 General Disclosures, 308 Supplier Assessment ; IFRS S1-22 Governance ; Scope 3-1 Purchased Goods & Services ; COSO: Control Environment / Info & Communication
B07-2	Midstream Collaboration	Record collaborative ESG verification activities in midstream as Proof Records, ensuring chain-wide accountability.	UID: enterprise ; Product ID: collaboration voucher ; SDGS Activity ID: B07-2	Enterprise sets ESG collaboration → uploads data	Midstream partners confirm → Proof Record generated	Initiators: ESG, supply chain teams ; Users: enterprises, consortia ; Participants: suppliers, distributors	150 pts • 0.80 → GRI 305 Emissions, 413 Local Communities ; IFRS S1-29 Social Responsibility ; Scope 3-1, 3-9 Supply Chain ; COSO: Risk Assessment / Control Activities
B07-3	Customer Confirmation	Turn downstream customer confirmations of ESG compliance into Proof Records.	UID: customer ; Product ID: confirmation voucher ; SDGS Activity ID: B07-3	Enterprise requests customer confirmation → uploads	Customer confirms compliance → Proof Record generated	Initiators: ESG, sales ; Users: enterprises, brands ; Participants: customers	150 pts • 0.80 → GRI 416 Customer Health & Safety ; IFRS S1-22 Governance ; Scope 3-9 Downstream Transport ; COSO: Information & Communication / Monitoring

B07-4	Result Disclosure	<i>Convert final ESG verification results into Proof Records, ensuring transparency for stakeholders.</i>	UID: enterprise ; Product ID: result voucher ; SDGS Activity ID: B07-4	Enterprise uploads ESG verification results	Results disclosed → Proof Record generated	Initiators: ESG, governance teams ; Users: enterprises, investors ; Participants: stakeholders	200 pts • 0.87 → GRI 102 Disclosures, 305 Emissions ; IFRS S2-6 Metrics & Targets ; Scope 3-1/9 Supply Chain ; COSO: Control Env / Monitoring
B08-1	Process Energy Efficiency	<i>Convert energy-saving measures in manufacturing processes into Proof Records for ESG disclosure.</i>	UID: enterprise ; Product ID: efficiency voucher ; SDGS Activity ID: B08-1	Manufacturing unit defines energy-saving steps → uploads	Production staff executes process → Proof Record generated	Initiators: production, ESG ; Users: listed companies, manufacturers ; Participants: employees	150 pts • 0.87 → GRI 302 Energy, 305 Emissions ; IFRS S2-13 Resource Efficiency ; Scope 3-2 Capital Goods ; COSO: Control Environment / Risk Assessment
B08-2	Waste Reduction	<i>Quantify waste minimization during production as Proof Records; ensure reductions are auditable.</i>	UID: enterprise ; Product ID: waste voucher ; SDGS Activity ID: B08-2	ESG/production defines reduction targets → uploads	Production logs reduced waste → Proof Record generated	Initiators: ESG, facility ; Users: enterprises, regulators ; Participants: employees	150 pts • 0.87 → GRI 306 Waste, 305 Emissions ; IFRS S2-14 Resource Management ; Scope 3-12 End-of-Life Waste ; COSO: Control Activities / Monitoring
B08-3	Water Optimization	<i>Record water-saving measures in processes as Proof Records, ensuring transparency in ESG disclosure.</i>	UID: enterprise ; Product ID: water voucher ; SDGS Activity ID: B08-3	Facility/ESG defines optimization plan → uploads	Staff executes → water data logged → Proof Record generated	Initiators: facility, ESG ; Users: enterprises, industry ; Participants: employees	150 pts • 0.80 → GRI 303 Water, 306 Waste ; IFRS S2-6 Metrics & Targets ; Scope 3-5 Water-related ; COSO: Control Env / Info & Communication
B08-4	Green Process Certification	<i>Ensure external green process certifications are converted into Proof Records.</i>	UID: verifier ; Product ID: certification voucher ; SDGS Activity ID: B08-4	Enterprise applies for certification → uploads	Verifier issues certification → Proof Record generated	Initiators: ESG, production ; Users: enterprises, investors ; Participants: third-party verifiers	200 pts • 0.87 → GRI 307 Environmental Compliance, 305 Emissions ; IFRS S1-22 Governance ; Scope 3 (process validation) ; COSO: Monitoring / Control Activities
B09-1	On-site Audit	<i>Convert on-site supplier audits into Proof Records, ensuring field compliance is measurable.</i>	UID: auditor ; Product ID: audit record ; SDGS Activity ID: B09-1	Enterprise commissions on-site audit → uploads plan	Auditor conducts on-site inspection → Proof Record generated	Initiators: ESG, procurement ; Users: listed companies, MNCs ; Participants: suppliers, auditors	200 pts • 0.87 → GRI 307 Environmental Compliance, 308 Supplier Assessment ; IFRS S1-22 Governance ; Scope 3-1 Purchased Goods & Services ;

							COSO: Control Environment / Risk Assessment
B09-2	Document Review	<i>Capture supplier ESG documentation reviews as Proof Records, ensuring paper trails are auditable.</i>	UID: supplier ; Product ID: document review voucher ; SDGS Activity ID: B09-2	Enterprise requests documents → uploads review log	Supplier submits docs → audit team verifies → Proof Record generated	Initiators: procurement, ESG ; Users: listed companies, SMEs ; Participants: suppliers, auditors	150 pts • 0.80 → GRI 102 Disclosures, 308 Supplier Assessment ; IFRS S1-29 Social Responsibility ; Scope 3-1 Purchased Goods & Services ; COSO: Control Activities / Info & Communication
B09-3	Sampling Check	<i>Record supply chain sampling checks as Proof Records, linking spot checks to ESG assurance.</i>	UID: auditor ; Product ID: sampling voucher ; SDGS Activity ID: B09-3	Enterprise defines sampling scope → uploads	Auditor executes sampling → logs results → Proof Record generated	Initiators: ESG, third-party auditors ; Users: enterprises, regulators ; Participants: suppliers, partners	150 pts • 0.80 → GRI 305 Emissions, 306 Waste ; IFRS S2-6 Metrics & Targets ; Scope 3-1 Purchased Goods & Services ; COSO: Risk Assessment / Monitoring
B09-4	Result Disclosure	<i>Convert final supply chain audit results into Proof Records; enhance transparency across stakeholders.</i>	UID: enterprise ; Product ID: result voucher ; SDGS Activity ID: B09-4	Enterprise uploads audit results → publishes	Results disclosed to stakeholders → Proof Record generated	Initiators: ESG, governance ; Users: investors, enterprises ; Participants: auditors, regulators	200 pts • 0.87 → GRI 102 General Disclosures, 307 Compliance ; IFRS S2-14 Resource Management ; Scope 3-1/9 Supply Chain ; COSO: Control Env / Monitoring
B10-1	Water-saving Facility Installation	<i>Convert installation of water-saving devices into Proof Records; ensure conservation actions are traceable.</i>	UID: enterprise ; Product ID: facility voucher ; SDGS Activity ID: B10-1	Facility/ESG team installs devices → uploads record	Staff uses facility → Proof Record generated	Initiators: facility, ESG ; Users: enterprises, schools ; Participants: employees, students	150 pts • 0.80 → GRI 303 Water ; IFRS S2-6 Metrics & Targets ; Scope 3-5 Water-related ; COSO: Control Environment / Info & Communication

B10-2	Reclaimed Water Use	Log reclaimed water usage as Proof Records; ensure recycling efficiency is auditable.	UID: enterprise ; Product ID: reclaimed water voucher ; SDGS Activity ID: B10-2	Facility/ESG defines reclaimed water plan → uploads	Staff implements reuse → Proof Record generated	Initiators: facility, ESG ; Users: enterprises, municipalities ; Participants: employees, citizens	200 pts • 0.87 → GRI 303 Water ; IFRS S2-14 Resource Management ; Scope 3-5 Water-related ; COSO: Control Activities / Monitoring
B10-3	Wastewater Treatment	Record wastewater treatment processes as Proof Records; ensure compliance and governance.	UID: enterprise ; Product ID: wastewater voucher ; SDGS Activity ID: B10-3	Facility team manages treatment → uploads report	Treated water verified → Proof Record generated	Initiators: facility, ESG ; Users: enterprises, regulators ; Participants: employees, auditors	200 pts • 0.80 → GRI 303 Water, 307 Environmental Compliance ; IFRS S1-22 Governance ; Scope 3-5 Water-related ; COSO: Risk Assessment / Control Activities
B10-4	Water Footprint Reporting	Convert water footprint reports into Proof Records; strengthen institutional transparency.	UID: enterprise ; Product ID: report voucher ; SDGS Activity ID: B10-4	ESG team compiles water footprint → uploads	Report shared with stakeholders → Proof Record generated	Initiators: ESG, sustainability teams ; Users: enterprises, investors ; Participants: stakeholders	200 pts • 0.87 → GRI 303 Water ; IFRS S2-6, S2-14 ; Scope 3-5 Water-related ; COSO: Control Env / Monitoring
B11-1	Green Investment Disclosure	Financial institutions disclose the proportion of green investments, converting submissions into Proof Records to enhance transparency.	UID: Financial institution ; Product ID: Investment disclosure voucher ; SDGS Activity ID: B11-1	Compliance/finance team uploads disclosure voucher → submits data	Institution completes disclosure → verification unit validates → Proof Record generated	Initiators: Compliance, Finance depts ; Users: Banks, asset managers ; Participants: Regulators	150 pts • 0.80 → GRI 201-2, GRI 302; IFRS S1/S2; Scope 3-15; COSO: Control Environment / Transparency
B11-2	ESG Financing	ESG project financing terms, fund allocation, and linked KPIs are logged as Proof Records to strengthen	UID: Financial institution ; Product ID: Financing voucher ; SDGS Activity ID: B11-2	Financing dept issues ESG financing voucher → defines conditions	Borrower submits project data → Proof Record validated	Initiators: Financing dept ; Users: Banks, funds ; Participants: Project enterprises	200 pts • 0.87 → GRI 201/203; IFRS S1 Risk, IFRS S2 Resource Allocation; Scope 3-15; COSO: Risk Assessment / Control Activities

		auditable ESG financing.					
B11-3	Green Insurance	Underwriting, premium, and claims of green insurance policies are logged as Proof Records to demonstrate social resilience and climate risk governance.	UID: Insurer ; Product ID: Insurance voucher ; SDGS Activity ID: B11-3	Insurance dept issues green insurance voucher	Policyholder subscribes or makes claim → Proof Record generated	Initiators: Insurance dept ; Users: Insurers ; Participants: Regulators, customers	150 pts • 0.78 → GRI 416, GRI 201; IFRS S1 Risk, IFRS S2 Climate; Scope 3-15; COSO: Control Activities / Information & Communication
B11-4	Carbon Finance Products	Issuance and trading of carbon finance products are converted into Proof Records, disclosing climate finance impact and market risk management.	UID: Financial institution ; Product ID: Carbon finance voucher ; SDGS Activity ID: B11-4	Innovation/finance unit issues carbon finance voucher → defines fields	Investors/enterprises participate in transactions → Proof Record generated	Initiators: Finance innovation unit ; Users: Banks, exchanges ; Participants: Regulators	200 pts • 0.87 → GRI 305, GRI 201; IFRS S2 Carbon Market Disclosure; Scope 3-15; COSO: Monitoring / Risk Control
B12-1	Insurance Policy Listing	Convert the issuance of ESG-related or trust-based insurance policies into Proof Records.	UID: insurer ; Product ID: policy voucher ; SDGS Activity ID: B12-1	Insurer defines policy terms → uploads policy	Policy listed and available → Proof Record generated	Initiators: insurers ; Users: enterprises, citizens ; Participants: policyholders	150 pts • 0.80 → GRI 102 General Disclosures, 416 Customer Health & Safety ; IFRS S1-22 Governance ; Scope 3-15 Investments ; COSO: Control Environment / Info & Communication
B12-2	Risk Protection	Ensure risk coverage and protection functions are logged as Proof Records, linking to	UID: insurer ; Product ID: protection voucher ; SDGS Activity ID: B12-2	Insurer defines coverage scope → uploads	Policyholder accesses protection → Proof Record generated	Initiators: insurers, enterprises ; Users: listed companies, SMEs ; Participants: employees, stakeholders	150 pts • 0.87 → GRI 201 Economic Performance, 416 Customer Safety ; IFRS S1-29 Social Responsibility ; Scope 3-15 Investments ; COSO: Risk Assessment / Control Activities

		<i>ESG risk governance.</i>					
B12-3	Claim Verification	<i>Record insurance claim processing and verifications as Proof Records, ensuring transparency.</i>	UID: insurer/policyholder ; Product ID: claim voucher ; SDGS Activity ID: B12-3	Policyholder files claim → insurer uploads verification	Claim verified → Proof Record generated	Initiators: insurers ; Users: enterprises, citizens ; Participants: policyholders, auditors	200 pts • 0.87 → GRI 416 Customer Health & Safety ; IFRS S1-22 Governance ; Scope 3-15 Investments ; COSO: Control Activities / Monitoring
B12-4	Reinsurance Collaboration	<i>Convert reinsurance agreements and ESG-related collaborations into Proof Records for auditability.</i>	UID: reinsurer ; Product ID: reinsurance voucher ; SDGS Activity ID: B12-4	Insurer engages reinsurer → uploads agreement	Reinsurer validates collaboration → Proof Record generated	Initiators: insurers, reinsurers ; Users: financial institutions ; Participants: insurers, investors	200 pts • 0.87 → GRI 201 Economic Performance, 102 General Disclosures ; IFRS S2-14 Resource Management ; Scope 3-15 Investments ; COSO: Control Env / Monitoring
B13-1	Waste Classification & Reporting	<i>Convert waste classification and reporting activities into Proof Records for ESG disclosure.</i>	UID: enterprise ; Product ID: waste report voucher ; SDGS Activity ID: B13-1	Facility/ESG team defines reporting system → uploads	Staff/classifiers submit waste data → Proof Record generated	Initiators: facility, ESG ; Users: enterprises, schools ; Participants: employees, students	100 pts • 0.78 → GRI 306 Waste ; IFRS S2-6 Metrics & Targets ; Scope 3-12 End-of-Life Waste ; COSO: Control Environment / Info & Communication
B13-2	Recycling Tracking	<i>Log recycling activities as Proof Records, ensuring material recovery is auditable.</i>	UID: enterprise ; Product ID: recycling voucher ; SDGS Activity ID: B13-2	Enterprise establishes recycling process → uploads	Staff/customers recycle → Proof Record generated	Initiators: ESG, facility, recycling partners ; Users: enterprises, communities ; Participants: employees, citizens	150 pts • 0.87 → GRI 301 Materials, 306 Waste ; IFRS S2-14 Resource Management ; Scope 3-12 Waste ; COSO: Risk Assessment / Monitoring
B13-3	Harmless Treatment	<i>Ensure hazardous waste treatment is converted into verifiable Proof Records.</i>	UID: enterprise ; Product ID: treatment voucher ; SDGS Activity ID: B13-3	Enterprise engages treatment provider → uploads	Waste treated & certified → Proof Record generated	Initiators: ESG, facility ; Users: enterprises, regulators ; Participants: treatment providers	200 pts • 0.93 → GRI 306 Waste, 307 Environmental Compliance ; IFRS S1-22 Governance ; Scope 3-12 End-of-Life Waste ; COSO: Control Activities / Monitoring

B13-4	Reuse Certification	<i>Convert reuse and circular economy certifications into Proof Records; strengthen ESG transparency.</i>	UID: verifier ; Product ID: reuse voucher ; SDGS Activity ID: B13-4	Enterprise applies for reuse program → uploads	Verifier issues certification → Proof Record generated	Initiators: ESG, recycling partners ; Users: enterprises, investors ; Participants: third-party verifiers	150 pts • 0.87 → GRI 301 Materials, 306 Waste ; IFRS S2-6, S2-14 ; Scope 3-12 Waste ; COSO: Control Env / Monitoring
B14-1	ESG Risk Governance Framework	<i>Establishment of ESG risk governance frameworks is Proof-logged, ensuring transparency and accountability in decision-making.</i>	UID: Financial institution ; Product ID: Risk governance voucher ; SDGS Activity ID: B14-1	Risk management dept issues voucher → defines framework	Internal audit validates → Proof Record generated	Initiators: Risk management dept ; Users: Banks, insurers ; Participants: Auditors, regulators	150 pts • 0.87 → GRI 201; IFRS S1; COSO: Risk Assessment
B14-2	Green Asset Allocation Policy	<i>Portfolio-level asset allocation policies for sustainable investments are Proof-logged to support governance and resource allocation.</i>	UID: Financial institution ; Product ID: Allocation policy voucher ; SDGS Activity ID: B14-2	Investment/portfolio dept issues voucher	Policy implemented in portfolios → Proof Record generated	Initiators: Investment/portfolio dept ; Users: Asset managers, investment firms ; Participants: Regulators	200 pts • 0.87 → IFRS S2; GRI 302; Scope 3-15
B14-3	Net-Zero Commitments & Roadmaps	<i>Institutional commitments and progress toward net-zero are logged as Proof Records, enabling transparent tracking and disclosure.</i>	UID: Financial institution ; Product ID: Net-zero roadmap voucher ; SDGS Activity ID: B14-3	Governance unit issues roadmap voucher → defines milestones	Progress reviewed annually → Proof Record generated	Initiators: Governance/strategy unit ; Users: Banks, insurers ; Participants: Investors, stakeholders	200 pts • 0.93 → GRI 305; IFRS S2-14; COSO: Control Environment / Monitoring

B14-4	Internal Control & Audit Tracking	<i>Internal control measures and audit outcomes</i>	UID: Financial			Initiators: Internal audit dept ; Users: Banks, financial holding companies ; Participants: Regulators, external auditors	
		<i>are converted into Proof Records, forming a verifiable chain of governance evidence.</i>	institution ; Product ID: Audit tracking voucher ; SDGS Activity ID: B14-4	Internal audit unit issues voucher → defines audit checks	Audit performed → Proof Record generated		200 pts • 0.87 → GRI 102-30 Governance; IFRS S1; COSO: Monitoring

Appendix C. Calculation Formulas and Proportional Rules

C.1 Weight Formula

Each module carries a Weight (W) factor derived from three proportional elements:

- CEF (Carbon Effect Factor): Contribution to emission reduction or avoidance.
- SEF (Social Effect Factor): Contribution to social participation and welfare.
- IRF (Institutional Relevance Factor): Relevance to governance, audit, and disclosure structures.

$$\text{Weight} = (\text{CEF} + \text{SEF} + \text{IRF}) / 15$$

- Each factor ranges from 1–5.
- The denominator 15 represents the maximum combined score.
- Weight (W) is normalized between 0.2 – 1.0 depending on module impact.

C.2 NTCC Formula

The Non-Tradable Carbon Credit (NTCC) value is calculated as:

$$\text{NTCC (kgCO}_2\text{e)} = \text{Participants} \times \text{Points} \times \text{Weight} \times 0.1$$

Where:

- Participants: Number of actors completing the task.
- Points: Task consumption points (20/30/50 for A-Series; 100/150/200 for B-Series).
- Weight: Derived from the Weight Formula above.
- 0.1: A standardized coefficient converting task-weighted points into kgCO₂e equivalents.

C.3 Application Examples

Example 1 – A-Series (Community Level)

- Task: A08. Green Dining Module
- Participants: 500
- Points: 20 (Low involvement)
- Weight: 0.6 (CEF=3, SEF=2, IRF=4 → $(3+2+4)/15=0.6$)

$$\text{NTCC} = 500 \times 20 \times 0.6 \times 0.1 = 600 \text{ kgCO}_2\text{e}$$

Example 2 – B-Series (Enterprise Level)

- Task: B05. Green Power Consumption Module
- Participants: 10 enterprises
- Points: 200 (High involvement)
- Weight: 0.8 (CEF=5, SEF=3, IRF=4 → $(5+3+4)/15=0.8$)

$$\text{NTCC} = 10 \times 200 \times 0.8 \times 0.1 = 160 \text{ kgCO}_2\text{e}$$

C.4 Recognition Principles

Recognition Principles

- Task-based Activities (Category A Modules)
Proof Records generated directly from task modules, with three layers of traceability (UID / Activity ID / Product ID).
→ 100% recognition (unit: kgCO₂e).
- Public Welfare Pool (Category B Modules)
NTCC triggered when participants convert points into the public welfare redemption pool.
→ Recognition capped at 30% of (A + B) combined (unit: kgCO₂e).

Formula

$$\text{NTCC}_{\text{total}} (\text{kgCO}_2\text{e}) = \text{A}_{\text{raw}} (\text{kgCO}_2\text{e}) + \min(\text{B}_{\text{raw}} (\text{kgCO}_2\text{e}), 0.3 \times (\text{A}_{\text{raw}} + \text{B}_{\text{raw}}) (\text{kgCO}_2\text{e}))$$

$$B_{rec} = \min(B_{raw}, 0.3 \times (A_{raw} + B_{raw}))$$

This rule prevents over-attribution from welfare pool exchanges and ensures task-based activities remain the anchor of recognition (100%).

Example

- $A_{raw} = 1,000 \text{ kgCO}_2\text{e}$
- $B_{raw} = 700 \text{ kgCO}_2\text{e}$
- $B_{rec} = \min(700, 0.3 \times 1,700) = 510 \text{ kgCO}_2\text{e}$
- $NTCC_{total} = 1,510 \text{ kgCO}_2\text{e}$

This design anchors recognition to the 100% task-based evidence, while limiting amplification from the welfare pool.

To ensure fairness and avoid overstated claims, PADV adopts proportional recognition rules:

- Category A (Community / Individual Modules):
 - Recognition rate = 100%
 - All calculated NTCC values are fully recognized, reflecting direct behavioral engagement.
- Category B (Enterprise / Institutional Modules):
 - Recognition capped at 30% of reported values
 - Ensures conservatism in corporate self-reporting and prevents overestimation of institutional impact.

C.5 Summary

The formulas and rules ensure that PADV's Proof Records are quantifiable, proportionally fair, and audit-ready. By combining task participation, point tiers, and weighted coefficients, PADV transforms diverse actions into standardized NTCC outputs that can be consistently applied across both individual and institutional contexts.

Appendix D. Scope 3 Coverage Matrix

D.1 Purpose

The Scope 3 Coverage Matrix demonstrates how PADV's 30 whitelist modules (A01–A16, B01–B14) comprehensively align with all 15 Scope 3 categories defined under the GHG Protocol. Each category is covered through Direct Proof Records (D) or Indirect Governance/Financial Evidence (I), ensuring full Scope 3 coverage.

D.2 Scope 3 Category Coverage Table

Scope 3 Category	PADV Modules	Coverage Type	Notes
1. Purchased goods & services	A08 Green Dining, B07 Supply Chain Verification, B09 Supply Chain Audit	D	Direct consumption records and supplier compliance Proofs.
2. Capital goods	B14 Sustainable Finance Governance	I	Governance and financial reporting on capital assets.
3. Fuel- & energy-related activities (not in Scope 1/2)	B05 Green Power Consumption	D	Renewable energy usage logs.
4. Upstream transportation & distribution	A14 Public Transport, B07 Supply Chain Verification	D/I	Commuting data (D), logistics governance (I).
5. Waste generated in operations	A02 Charity Activities (Clean-ups), B09 Supply Chain Audit	D/I	Community waste participation (D), enterprise audits (I).
6. Business travel	A02 Charity Activities, A12 Event Participation	D	Travel-related Proof Records (attendance,

Scope 3 Category	PADV Modules	Coverage Type	Notes
			mobility).
7. Employee commuting	A14 Public Transport, A12 Event Participation	D	Public transport and commuting Proof Records.
8. Upstream leased assets	B14 Sustainable Finance Governance	I	Reporting and governance of leased infrastructure.
9. Downstream transportation & distribution	A14 Public Transport, B07 Supply Chain Verification	I	Distribution chain traced via Proof Records.
10. Processing of sold products	B07 Supply Chain Verification, B09 Supply Chain Audit	I	Supplier process audits linked to product processing.
11. Use of sold products	A16 Service Upgrade, B11 Sustainable Finance Products	I	Service upgrades extend lifecycle; financed products' use-phase data.
12. End-of-life treatment of sold products	A08 Green Dining, A02 Charity (Recycling), A16 Service Upgrade, B09 Supply Chain Audit	D/I	Recycling, clean-up Proofs (D), governance audits (I).
13. Downstream leased assets	B14 Sustainable Finance Governance	I	Leased asset governance and reporting.
14. Franchises	B14 Sustainable Finance Governance	I	Governance structures for franchise-level disclosure.
15. Investments	B11 Sustainable Finance Products	D	Direct Proof Records from ESG loans, funds,

Scope 3 Category	PADV Modules	Coverage Type	Notes
			insurance.

D.3 Coverage Analysis

- Strong Direct Coverage: Categories 1, 3, 6, 7, 12, 15.
- Mixed Direct/Indirect Coverage: Categories 4, 5, 9.
- Indirect but Essential Coverage: Categories 2, 8, 10, 11, 13, 14.

This distinction ensures no Scope 3 category remains unaddressed. Even traditionally “hard-to-measure” categories (leased assets, product use-phase, franchises) are supported by indirect governance and financial Proof Records.

D.4 Institutional Value

- PADV transforms Scope 3 from estimation → verification.
- Direct Proof Records (e.g., dining, commuting, renewable energy) are behavioral anchors.
- Indirect Proof Records (e.g., governance, finance, audits) provide structural assurance.
- Together, PADV creates a full Scope 3 verification ecosystem, enabling enterprises to disclose with confidence and auditors to validate with precision.

Appendix E. International Standards Alignment Matrix

E.1 How to read

- **GRI:** key topic/indicator (e.g., 302-1 Energy, 305-5 Emissions reduction, 413 Community).
- **IFRS:** **S1** (General Requirements), **S2** (Climate).
- **COSO:** **CE** Control Environment, **RA** Risk Assessment, **CA** Control Activities, **IC** Info & Communication, **MON** Monitoring.
- **TCFD:** **Gov** Governance, **Strat** Strategy, **RM** Risk Management, **M&T** Metrics & Targets.
- **ISO:** primary linkage (e.g., **14064** GHG, **14001** EMS, **50001** Energy Mgmt, **27001** Information Security).
- **QS** (Sustainability Ranking): **EI** Environmental Impact, **SI** Social Impact, **GI** Governance/Institutional.

Notes: Cells list primary alignments (what an auditor will look for first). Secondary links can be expanded in a technical annex.

E.2 PADV × International Standards (All 30 Modules)

Module	GRI	IFRS	COSO	TCFD	ISO	QS
A01 Exhibition	302-1, 305-5, 413	S2 (event footprint), S1	CA, IC, MON	RM, M&T	14064, 14001	EI, SI
A02 Charity Activities	403, 413	S1 (social outcomes)	CE, MON	RM	14001	SI, GI
A03 Campus	404 (training), 413	S1	IC, MON	RM	14001	SI, GI
A04 Employee ESG Tasks	404, 2-9/2-12 (governance)	S1	CE, CA, MON	Gov	14001	GI

Module	GRI	IFRS	COSO	TCFD	ISO	QS
A05 Digital Conference	302, 305-5	S2 (travel avoidance)	CA	M&T	14064	EI
A06 Remote Work	302, 305-5	S2 (commuting)	CA	M&T	14064	EI
A07 Business Travel	302, 305-3/-5	S2 (travel)	RA, CA	RM, M&T	14064	EI
A08 Green Dining	302, 306, 305-5	S2 (Scope 3-1)	CA, MON	M&T	14064	EI
A09 Healthy Living	403, 404	S1	CE, IC	Gov	14001	SI
A10 E-commerce Logistics	301, 302, 306	S2 (up/downstream)	RA, CA	RM	14001, 14064	EI
A11 Cultural Activities	413	S1	IC	Gov	14001	SI
A12 Sustainable Accommodation	302-1, 305-5, 306	S2 (Scope 3 travel)	CA	RM, M&T	14001, 14064	EI
A13 EV Leasing	302, 305-5	S2 (use-phase)	RA, CA	Strat, M&T	14064	EI
A14 Public Transport	305-5	S2 (commuting)	CA	M&T	14064	EI
A15 Community Activities	413	S1	CE, IC	Gov	14001	SI, GI
A16 Service Upgrade	301, 306, 305-5	S2 (use/EoL)	RA, MON	Strat, M&T	14001, 14064	EI
B01 Upstream & Downstream	301, 308, 414	S2 (Scope 3)	RA, CA	RM	14001, 14064	GI

Module	GRI	IFRS	COSO	TCFD	ISO	QS
B02 Green Procurement	301, 308	S2 (purchased goods)	CA, MON	RM	14001	GI
B03 Energy-Efficient Equipment	302-1, 305-5	S2	CA, MON	M&T	50001, 14001	GI
B04 Food Supply Chain	301, 306, 308	S2 (agri/food chain)	RA, CA	RM	14001, 14064	GI
B05 Green Power Consumption	302-1, 305-5	S2 (Scope 2)	CA, MON	M&T	50001, 14064	EI, GI
B06 Carbon Audit Collaboration	305, 2-5/2-6 (GRI governance)	S1/S2 (controls, data)	IC, MON	Gov, RM	14064	GI
B07 Supply Chain ESG Verification	308, 414, 301	S2 (Scope 3-4/9)	RA, CA, MON	RM	14001, 14064	GI
B08 Green Manufacturing	302, 303, 306, 305-5	S2	CA, MON	M&T	14001, 50001	EI, GI
B09 Supply Chain Audit	301, 306, 308/414	S1/S2 (assurance)	CE, RA, CA, MON	Gov, RM	14001	GI
B10 Water Resource Management	303	S1/S2 (risk)	RA, CA	RM, M&T	14001	EI
B11 Sustainable Finance Products	201, 305	S2 (financed emissions), S1	RA, IC	Gov, M&T	14064 (portfolio methods)*	GI
B12 Trust & Assurance	416, 201	S1/S2 (risk/impact)	RA, MON	RM	14001	GI

Module	GRI	IFRS	COSO	TCFD	ISO	QS
Insurance						
B13 Waste Management	306	S1/S2 (waste risks)	CA, MON	RM, M&T	14001	El, GI
B14 Sustainable Finance Governance	2-9/2-12 (governance)	S1 (gov), S2 (oversight)	CE, RA, CA, IC, MON	Gov, RM	—	GI

* Institutions may apply ISO-aligned portfolio GHG approaches in tandem with PADV Proof Records.

E.3 Usage guidance

- Attach Proof Records: For each reported alignment, append PADV evidence (UID / Product ID / SDGS Activity ID).
- Keep it auditable: COSO and TCFD columns show where governance and risk processes should pull PADV data.
- Education lens: A-series modules (campus, community, transport) feed QS SI/El; B-series governance feeds QS GI.

Appendix F. Assurance Pack Template

F.1 Purpose

The PADV Assurance Pack provides a standardized framework for auditors, verifiers, and assurance providers to test Proof Records generated under the Whitelist Modules (A01–A16, B01–B14). It ensures consistency, traceability, and audit-readiness across ESG disclosures.

F.2 Structure of the Assurance Pack

Module Sampling Protocols

- Random sampling across Proof Records by module ID.
- Risk-based sampling for high-impact modules (e.g., B05 Green Power, B11 Sustainable Finance Products).
- Stratified sampling for mixed actor types (individuals vs. enterprises).

Reconciliation Methods

- Event-level reconciliation: Compare PADV Proof Records with independent attendance or activity logs.
- Transaction-level reconciliation: Cross-check PADV outputs with invoices, contracts, or energy bills.
- System-level reconciliation: Validate UID/Activity IDs against registry databases for duplication or anomalies.

Field-to-Chapter Mapping

- Proof Record Fields → PADV Chapters
 - UID / Activity ID → Ch3 (Verification Chain & Six-Layer Boundary)
 - Task Points → Ch4 (Whitelist Modules)
 - Weight & NTCC → Ch5 (Disclosure Mapping Methodology)
 - Standard Linkage → Ch6 (Alignment with International Standards)
 - Governance Trail → Ch9 (Governance, Cybersecurity, and Privacy)

F.3 Machine-Readable Output Formats

To facilitate integration with enterprise systems and audit platforms, PADV Proof Records can be exported in the following formats:

- CSV – Tabular format for spreadsheets and bulk data checks.
- XML – Hierarchical format for enterprise reporting systems.
- JSON – Lightweight format for APIs, dashboards, and automated verification pipelines.

Example JSON output (simplified):

```
{  
  
  "ModuleID": "B05",  
  
  "ProofRecordID": "UID-2025-0001",  
  
  "Participants": 3,  
  
  "Points": 200,  
  
  "Weight": 0.8,  
  
  "NTCC_kgCO2e": 48,  
  
  "StandardsMapping": ["GRI 302-1", "IFRS S2", "Scope 2"],  
  
  "Timestamp": "2025-09-16T12:30:00Z"  
}
```

F.4 Suggested Sampling Rates

- Low-risk modules (A-series, <50 pts per action): 5–10% sample.
- Medium-risk modules (B-series, 100–150 pts): 10–20% sample.
- High-risk modules (B-series, 200 pts or financial governance): 20–30% sample.

F.5 Audit Tolerance Thresholds

- Quantitative Data (e.g., NTCC kgCO₂e): ±5% tolerance.
- Qualitative Data (e.g., participation narratives): 95% match against source records.
- System Logs (UID/ID validation): 100% accuracy required.

F.6 Summary

The Assurance Pack template establishes clear, repeatable audit protocols for PADV Proof Records. By combining sampling logic, reconciliation checks, and machine-readable outputs, it ensures PADV is not just a reporting tool but a verifiable audit infrastructure ready for Big4, verification bodies, and regulators.

Appendix G – PADV Enterprise Implementation Guide

G.1 Purpose

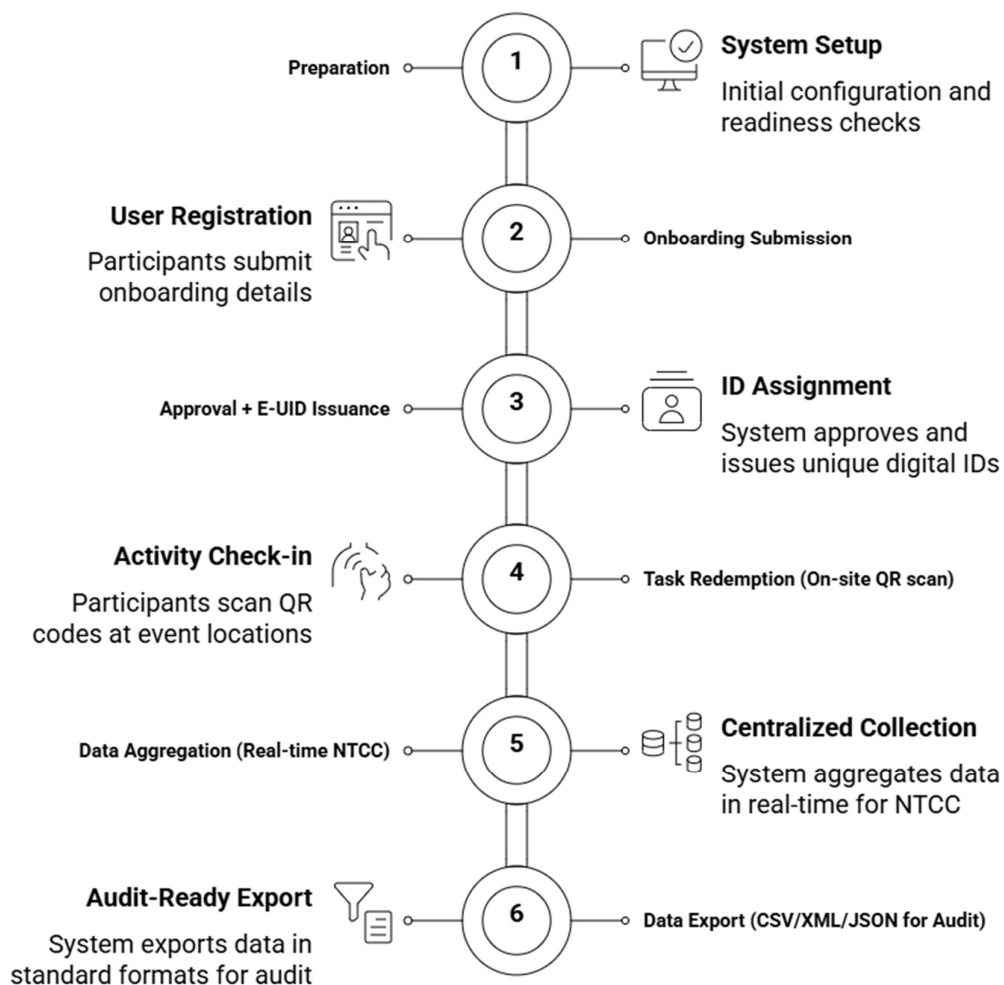
This guide outlines the six standard steps for enterprises to implement PADV. It ensures that task-based modules and public welfare redemption pools are properly onboarded, verified, and integrated into auditable ESG reporting.

G.2 Six-Step Enterprise Onboarding Process

Step	Title	Description	Deliverables
1	Preparation	- Understand the overall PADV operational logic. - Select appropriate whitelist sub-tasks for deployment, or choose products/services for the public welfare redemption pool.	Task and/or product list prepared for onboarding
2	Onboarding Submission	- Submit product / service / task information via standardized PADV onboarding forms.	Completed onboarding forms with metadata
3	Approval & Account Provisioning	- PADV Secretariat reviews and approves the onboarding submission. - Enterprise receives backend login credentials (E-UID) and an operations manual.	E-UID certificate, admin login, operations manual
4	Task Redemption (Verification)	- Physical tasks and channels require on-site QR code scanning for redemption. - This ensures verifiable participation data capture at the source.	Verified Proof Records linked to UID/Activity ID
5	Data Aggregation	- Enterprises can log into the backend dashboard at any time to check real-time NTCC details (units: kgCO₂e).	Live NTCC monitoring dashboard

Step	Title	Description	Deliverables
6	Data Export	- Export NTCC records and participation data for a selected time period. - Machine-readable output formats (CSV, XML, JSON) enable third-party verification and audit.	Assurance-ready datasets for auditors/verifiers

G.3 Workflow Diagram (Recommended Visual)



G.4 Key Notes

- Recognition Principles:
 - Category A (Task-based): 100% recognition (unit: kgCO₂e)
 - Category B (Public welfare pool): Recognition capped at 30% of (A + B) (unit: kgCO₂e)
- Conversion Basis: 10 SDGS PASS points = 1 kgCO₂e
- Verification: All exported data can be attached as part of the PADV Assurance Pack for integration into ESG disclosures.