Deloitte.

SAP Green Ledger
Discussion Paper

June 2024

CONTENTS

THE NEED FOR GREEN ACCOUNTING

01

Companies face increasing pressure from regulators, stakeholders, and consumers to limit environmental impact, but often lack accurate and decision-useful data to confidently decarbonize.

The demand on organizations for reliable emissions data is growing at a rapid pace through evolving disclosure requirements, tax obligations, and mounting stakeholder and consumer expectations. In response, many companies are turning to specialist greenhouse gas (GHG) measurement & reporting software. However, mainstream solutions typically lack tight integration with core business systems, such as enterprise resource planning (ERP) applications, so cannot synchronize with financial data for decision-useful information at an operational level.

There is also opportunity to enhance underlying GHG accounting methods by applying financial accounting concepts (e.g., double entry, reconciliations, balances carried forward) to help add rigor, traceability, and accountability.

To help increase credibility of non-financial reporting and mitigate against greenwashing risks and litigation/fines/penalties, while also creating new opportunities for investment, customer loyalty, resilience, and growth, companies should adopt more robust GHG accounting practices coupled with enabling technologies. As in financial accounting, both are critical to achieving accuracy, assurance, and control as well as creating actionable insights to drive outcomes.

SAP's Green Ledger aims to support these goals, establishing connectivity between GHG and financial data to help identify credible decarbonization opportunities and monitor progress with a reliable and rapid feedback loop.

This paper explores the business benefits of prioritizing the quantification of climate risk through a shift towards treating emissions as currency.

ADAPTING TO REGULATORY DRIVERS

With regulatory pressure mounting, controlled and assurable GHG accounting is a top priority for Chief Sustainability Officers and Chief Financial Officers. Deloitte maintains ongoing dialogues with governing bodies and standards setters and understands the regulatory direction of travel. This section explores the evolving compliance landscape and the role of SAP Green Ledger in helping to facilitate disclosure and external assurance.

The 'Big Three' Disclosures and the Road to Reasonable Assurance

International Sustainability Standards Board (ISSB)

- In June 2023, the ISSB, formed by the International Financial Reporting Standards (IFRS) Foundation to sit alongside the International Accounting Standards Board (IASB), issued its first two **IFRS Sustainability Disclosure Standards (IFRS S1 & S2)**[1]. IFRS S2 Climate-related Disclosures requires disclosure of direct (scope 1), energy-related indirect (scope 2), and value chain-related indirect (scope 3) emissions aligned to the Greenhouse Gas Protocol Corporate and Scope 3 Standard.
- 390+ organizations across 64 jurisdictions signed a **declaration of support**[2] at COP28, with several **jurisdictional consultations**[3] completed or underway.

European Financial Reporting Advisory Group (EFRAG)

- Since 2023, companies with significant activity in the EU have been working towards readiness to comply against the **Corporate Sustainability Reporting Directive (CSRD)**[4] from January 2024, through adoption of the European Sustainability Reporting Standards (ESRS), which include disclosure of GHG Protocol scope 1, 2 and 3 emissions.
- According to CSRD (Article 26a), the European Commission plans to introduce mandatory reasonable assurance, with equivalent scrutiny to financial audit, no later than 1 October 2028. This transition will demand a significant increase in accuracy, traceability and control of emissions data, which solutions like SAP Green Ledger can support.

Securities and Exchange Commission (SEC)*

- In March 2024, the SEC issued its long-awaited **final rule on climate-related disclosures**[5], which includes mandatory disclosure of scope 1 and 2 emissions, which is immediately subject to external limited assurance. Scope 3 emissions will be subject to limited assurance from 2030 and reasonable assurance (for Large Accelerated Filers) from 2033.
- Additionally, some States are introducing local requirements. For example, California Senate Bill 253 (passed in October 2023), requires US companies with US$1 billion revenue doing business in California to disclose scope 1, 2 and 3 emissions from 2026, which is immediately subject to limited assurance, moving to reasonable assurance from 2030.

The transition to reasonable assurance demands a radical shift towards transparent, controlled, and verifiable GHG accounting. Solutions like SAP Green Ledger will allow more reliance to be placed on ERP controls, significantly reducing manual assurance effort, increasing efficiencies and rigour while also mitigating against consequences of non-compliance.

Environmental Taxes

Excise and Energy Taxes

Proposed changes[6] to the EU Energy Tax Directive indicate future tax rates may be based on real emissions associated with the fuel, demanding increased accuracy in footprint calculations.

Taxes on Direct Emissions

According to the World Bank[7], there are currently 38 live carbon taxes across 27 jurisdictions, with 13 more under active consideration. Without robust GHG accounting tools, organizations may lack confidence in their calculated direct emissions CO_2e tax base, resorting to intentional overpayment to mitigate risk of litigation and fines/penalties.

Emission Trading Systems (ETS) and Carbon Border Adjustment Mechanisms (CBAM)

ETS schemes, active in many jurisdictions (e.g., EU, UK, China), apply a 'cap & trade' approach to carbon pricing, where businesses can trade surplus government-issued allowances (in CO_2e).

To prevent European companies relocating emission-intensive activities to circumvent EU ETS allowances, the EU CBAM applies an equivalent carbon price on the CO_2 of imported emission-intensive goods (e.g., steel, cement, fertilizers). Currently in a reporting-only transition phase, CBAM import duty is payable from January 2026, making accurate GHG accounting critical for companies to successfully navigate implications on production and transportation of emission-intensive goods.

Product Environmental Footprint (PEF) and Digital Product Passports (DPPs)

Product lifecycle assessments (LCAs) are used to determine the environmental impact, including GHG emissions, of a product throughout its entire lifecycle ("cradle-to-grave"), covering both upstream ("cradle-to-gate") and projected downstream ("gate-to-grave") emissions.

Introduced in 2021, the EC's Product Environmental Footprint (PEF)[8] methodology applies more stringent rules than traditional LCAs in calculating product footprints. While not yet mandatory, the PEF method is currently in a transition phase planned for completion at the end of 2024.

As an extension to the EC's 2022 Ecodesign for Sustainable Products Regulation (ESPR), it plans to introduce a "Digital Product Passport" to carry information about products' environmental sustainability, including carbon footprints.

To protect consumers from greenwashing, the EC's proposed Green Claims Directive[9] could carry fines for unsubstantiated green product claims of at least 4% of annual turnover, confiscation of revenues, and exclusion from public procurement tenders.

Most product LCAs are performed infrequently, divorced from core ERP processes, and without regular reconciliation to actuals for cradle-to-gate emissions. SAP Green Ledger presents the opportunity to incorporate cradle-to-gate product footprint calculation into core production and cost accounting processes, significantly increasing accuracy while reducing effort.

MAXIMIZING OPPORTUNITIES AND BUILDING RESILIENCE

The transition to a sustainable economy presents significant opportunity but also threatens businesses that fail to adapt. This section explores how SAP Green Ledger could facilitate access to capital, attract climate-conscious consumers, safeguard brand image, and build business resilience.

Government Investment

In recent years, governments have committed landmark levels of investment towards decarbonization (e.g., €500 billion investment in the European Green Deal[10], US$433 billion investment in the US Inflation Reduction Act[11]). To qualify for, and maintain access to green incentives, companies are often required to provide transparency into environmental performance. Technologies like SAP Green Ledger will be pivotal in providing verifiable reporting and demonstrating substantiated progress against committed targets.

Access to Green Capital

In a comparatively high interest rate environment, access to 'green bonds' can significantly reduce borrowing costs. Green bonds have grown to US$2 trillion[12], representing 2.4% of the global bond market. Demonstrating transparent and measurable emission reductions to green investors will open new investment channels, whilst identifying ways to reduce profit erosion through carbon taxes, aligning to shareholders' interests.

Increasing Consumer Consciousness

Purchase preferences are changing. Studies have shown that consumers will pay more for sustainable products, with products making ESG claims achieving disproportionate growth[13], while attracting greater brand loyalty. One in ten consumers[14] make purchase decisions based on availability of product carbon footprint data.

Business Resilience

As we transition to a sustainable economy, companies that fail to adapt risk obsolescence[15]. Quantifying and mitigating risks associated with value chain emissions with confidence requires systematic control over processes and data, which SAP Green Ledger can support.

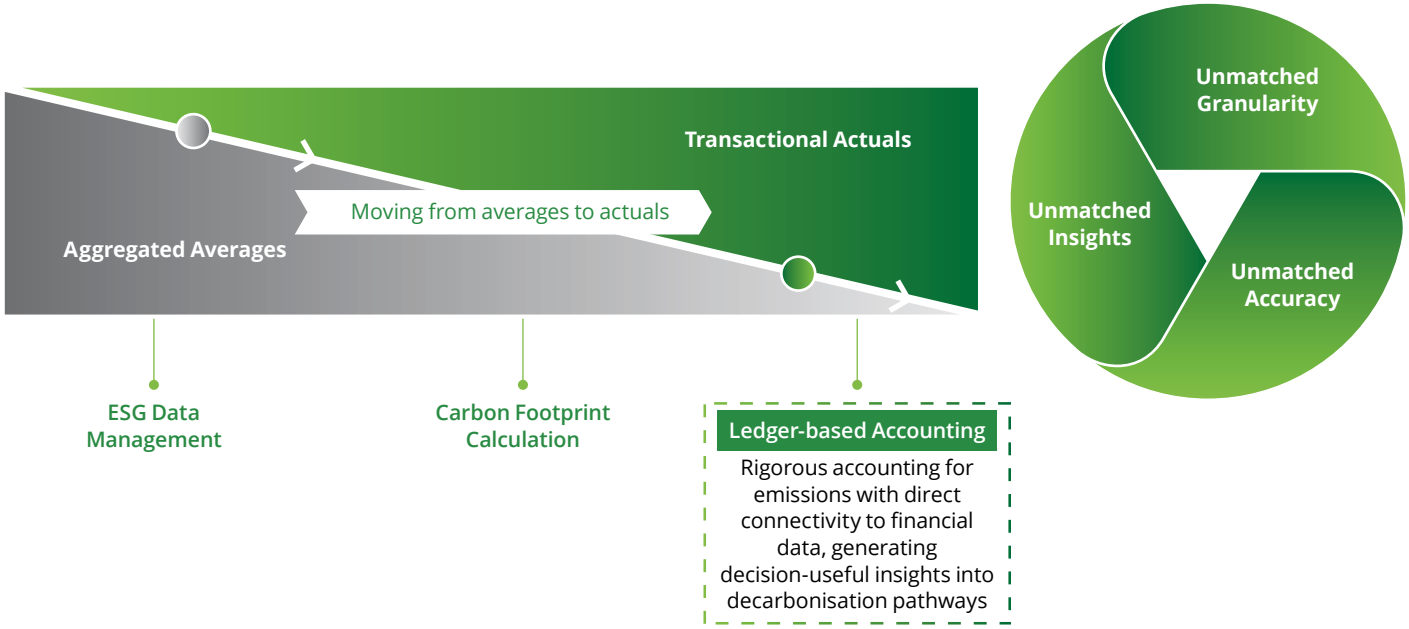
Technologies like SAP Green Ledger can help businesses successfully navigate the imperative transition to a sustainable economy by equipping them with reliable data that not only supports compliance, but crucially, helps them better manage climate risks and identify opportunities to capitalize on market shifts.

THE SAP GREEN LEDGER VISION

02

Through a radical shift in treatment of emissions data, the vision behind SAP Green Ledger goes beyond pure compliance, towards decision-useful information to steer and track decarbonization. This is achieved by establishing full integration between emissions and finance data, applying equivalent control and granularity as financial bookkeeping, all underpinned by rigorous accounting treatment.

End-to-End Carbon Management with SAP Green Ledger



Source: Gunther Rothermel & Nico Wottke, "Start your Carbon Accounting Journey with SAP Sustainability Footprint Management," SAP, June 14, 2023.

SAP Green Ledger will support organizations in several critical areas:

Compliance & Steering

- Support mandatory compliance at entity and consolidated group level (via **SAP Group Reporting**).
- Generate assurable finance-quality GHG inventory disclosures.
- Create decision-useful dual-axis management reporting across finance and emissions (in **SAP Sustainability Control Tower**).
- Serve as a foundation of actuals, to enable planning (e.g., in **SAP Analytics Cloud**) and scenario modelling of financial and environmental impact, risks and opportunities.

Automation, Efficiency & AI

- Increase efficiency and automation of GHG data collection.
- Enable sophisticated allocation rules, integrated with traditional finance processes, to digitize sustainability processes at scale.
- Apply AI to increase efficiency and identify the highest value decarbonization levers.

Emission Flow & Integration

- Support data collection from diverse sources (e.g., calculated in SAP Sustainability Footprint Management, or sourced from suppliers via SAP Sustainability Data Exchange).
- Post emission quantities via journal entries against existing financial information (e.g., general ledger accounts).
- Embed end-to-end carbon management within transactional business activities (e.g., goods movements, manufacturing, business travel).
- Account for internal/external carbon prices (e.g., traded certificates, permanent carbon sequestration credits, CBAM).
- Provide the ledger foundation for adjacent topics (e.g., water, waste).

As the SAP Green Ledger vision becomes reality, organizations will be equipped to create data flows with sophisticated allocation rules, implement internal carbon pricing, scenario-model climate risk, and more. While the SAP Green Ledger will continue to evolve, several foundational activities should be undertaken now to accelerate time to value, which are discussed later in this paper.

GHG ACCOUNTING PRINCIPLES, STANDARDS, AND METHODS

03

To achieve credible, transparent, and decision-useful information, any emissions ledger must be anchored by robust GHG accounting principles. There has been considerable evolution of thought in this area by standard-setting boards and prominent academics.

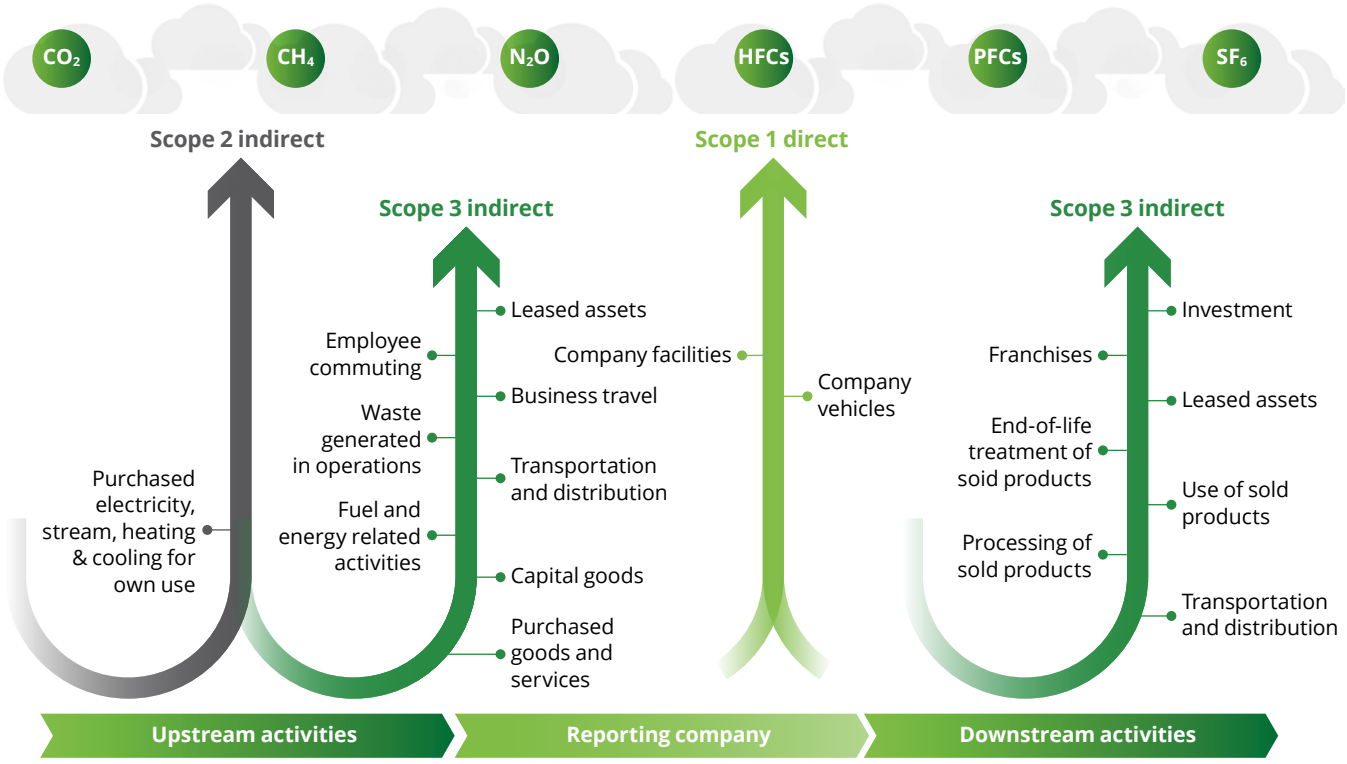
The GHG Protocol Corporate and Product Standards

The GHG Protocol's Corporate Standard[16] (published 2001, last revised 2004) and Corporate Value Chain (Scope 3) Standard[17] (published 2011), are the dominant standards used globally for disclosing a company's direct and indirect emissions footprint.

The GHG Protocol Corporate, and Corporate Value Chain (Scope 3) Standards underpin most regulatory and voluntary frameworks.

The Corporate and Scope 3 Standard underpin most regulatory and voluntary frameworks (including the "big three" climate disclosures) and establishes comprehensive coverage of a company's upstream and downstream impact across the entire value chain.

Similarly, the GHG Protocol Product Standard[18] (published in 2011) provides requirements and guidance on calculating a product's cradle-to-grave GHG footprint throughout its entire lifecycle, covering upstream cradle-to-gate and projected downstream gate-to-grave emissions.



Source: "Corporate Value Chain (Scope 3) Accounting and Reporting Standard," World Resources Institute & World Business Council for Sustainability Development.

The GHG Protocol standards carry several **merits**, including:

- **Coverage:** The comprehensive framework allows organizations to estimate the broad extent of their impact across the value chain.
- **Consistency:** The codified framework and standards enable comparability between organizations.
- **Credibility:** The GHG Protocol is widely recognized by investors, regulators, and non-governmental organizations (NGOs).
- **Adoption:** Widespread adoption (now mandatory in several jurisdictions, as discussed earlier in this paper) means organizations and stakeholders can speak a common language.

The GHG Protocol provides an extensive reporting framework for considering all indirect aspects of a company's GHG footprint.

The GHG Protocol standards are highly effective instruments for quantifying and disclosing impact across the entire value chain. While, in their initial form, they were not intended to create an accounting system with equivalent rigour and granularity to financial accounting, the now authoritative standards will naturally continue to evolve, to overcome their **limitations** in this regard:

- **Reconciliation:** The GHG Protocol does not provide an accounting mechanism for detailed reconciliation between (cradle-to-gate) product footprints and related corporate emissions (e.g., amortization and allocation of emissions from plants or equipment into products), limiting traceability and risking emissions being "lost" from an accounting perspective.
- **Responsibility:** Under the Corporate Standard, companies are not required to maintain a point-in-time GHG inventory (balance sheet) or carry forward positions, meaning accountability for past emissions is limited to historic disclosures.
- **Double-counting:** By design, scope 3 generates double-counting, which helps drive collective action across the value chain, but is inefficient and undesirable in an accounting system for assigning individual accountability.
- **Value chain estimation:** Companies are expected to consider scope 3 emissions of the entire value chain, with uncertainty growing exponentially with each tier. Inevitably, this leads to high degrees of estimation (often using industry average emission factors).
- **Downstream speculation:** Estimated downstream emissions are speculative and virtually impossible to validate based on actual emissions.
- **Uncontrollability:** Beyond product design and blacklisting direct customers, downstream emissions are beyond the reporting company's control (unlike upstream emissions, where companies are better positioned to encourage suppliers to reduce emissions).

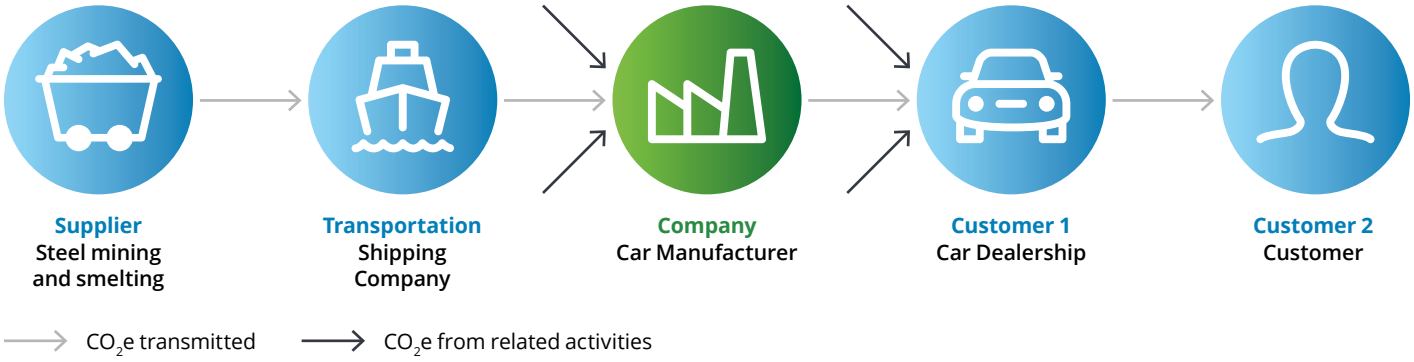
The GHG Protocol provides an extensive reporting framework for considering all indirect aspects of a company's GHG footprint. The GHG Protocol Corporate Standard (along with Scope 2 Guidance and the Scope 3 Standard) is currently undergoing a two-year revision process[19] following a five-month public consultation with over 1,400 survey responses, where better alignment with financial accounting was identified as a theme in the stakeholder feedback.

Enhancing GHG Reporting with Financial Accounting Concepts

Academics from several institutes, including Harvard, Oxford, Columbia and Stanford universities have suggested improvements to existing GHG accounting standards, by applying concepts from financial accounting.

Introduced in 2021 by Profs. Robert Kaplan & Karthik Ramanna, the E-liability approach[20] employs double-entry cost and inventory accounting methods to allocate upstream and direct emissions into products/services, represented as "E-liabilities". These are transferred from supplier to customer, compounding with each company's direct emission contribution (e.g., manufacturing, logistics) throughout the value chain. The approach recommends downstream emissions[21] are only estimated and disclosed by direct-to-consumer (B2C) companies, making a clear distinction between accounting and disclosure

Sample Value Chain



Source: "What is E-liability? What are E-assets?," The E-liability Institute.

In the context of scopes 1-2, upstream scope 3 emissions, and cradle-to-gate product footprints, the concepts are no different from the GHG Protocol. Building on this, the E-liability approach attempts to apply cost accounting methods to allocate upstream corporate emissions into cradle-to-gate product footprint calculations and reconcile between the two.[†]

Subsequent papers have built on the double-entry accounting concepts presented in the E-liability approach, including Jia et al. (2022)[22], Deloitte & H2 Green Steel (2023)[23], Reichelstein (2023)[24], and Penman (2024)[25].

Alignment with financial accounting concepts and methods carries several **advantages**:

- **Accounting rigour:** Employing double-entry accounting and maintaining a GHG balance sheet creates traceability between corporate emissions and product footprints, ensuring emissions are never "lost".
- **Mutual exclusivity:** Emissions are accounted for only once and transmitted, improving efficiency and avoiding double-counting.‡
- **Accuracy:** By narrowing the focus to Tier 1 value chain partner interactions only, total measurement uncertainty is theoretically reduced (but only if a standard methodology is widely adopted – see limitations alongside).
- **Tax basis:** An accounting system that supports full reconciliation between inherited/direct emissions and emissions transferred to customers could provide a foundation for value chain GHG taxation schemes (akin to VAT or excise duty) to stimulate consumer pressure and incentivize decarbonization throughout the value chain.

However, several **limitations** remain:

- **Relies on mass adoption:** Unless the entire value chain subscribes to and implements a uniform methodology, the upstream estimation challenges remain, and the regulatory drivers cannot be implemented (i.e. value chain GHG taxation schemes).
- **Limited scope:** Accounting only for upstream emissions loses the comprehensive view of a company's full impact and exposure to emissions.
- **"Passing the buck":** Transferring embodied product footprints may be misinterpreted as evading responsibility, though reporting instruments like GHG flow statement (akin to a cashflow statement) transparently communicate all upstream and direct emissions.
- **Emission masking:** E-Liability and similar methods allow application of carbon sequestration credits to neutralize product footprints partially or fully. Unless this is consistently communicated down the value chain, the gross upstream exposure is hidden from customers.
- **Unproven:** Detailed accounting treatments are not yet fully codified and the concept is new and relatively unproven, though 40+ global organizations[26] are exploring E-Liability pilots.
- **Distinct from finance:** Treating emissions embodied in financial assets as E-liabilities creates an inherent dichotomy in accounting terms.

Implementation of the E-Liability method, or similar accounting approaches, is contingent on a brand new, distinct GHG chart of accounts and ledger, which would lead to costly and lengthy implementations. The next section covers how connecting financial and emissions reporting is not only more feasible, but critical to generating decision-useful information.

Connected Financial & Green Accounting

Connectivity between financial and emissions reporting is becoming an increasingly prevalent theme among standard setters. This section explores this concept and practical applicability of financial accounting methods to emissions data.

In August 2022, IFRS established the Integrated Reporting and Connectivity Council (IRCC)[27] to advise the ISSB and IASB on the connectivity of reporting requirements across both sets of standards. As part of the Integrated Reporting Framework[28], connectivity between financial statements and sustainability-related financial disclosures has been identified as a key concept.

In June 2023, the EFRAG Connectivity Advisory Panel[29] was similarly established to research connectivity between financial reporting and sustainability reporting[30].

Aligned to this concept, in April 2024, SAP and the Technical University of Munich published a paper proposing transactional connectivity between finance and carbon[31]. In contrast to the approaches previously discussed in this paper, emissions are treated as a measurement attribute of existing financial transactions, increasing connectivity while leveraging generally accepted accounting principles (GAAP) for finance.

The "carbon flow" statement provides transparency of in-period movements, enabling GHG Protocol-aligned disclosure for scope 1, 2, and upstream scope 3 emissions. Notably, the proposed model intentionally excludes aspects of GHG Protocol that are not linked to any company costs (e.g., employee commuting, downstream scope 3), which are to be satisfied through separate estimation and disclosure.

The approach carries several **merits**:

- **Accounting rigour, mutual exclusivity, accuracy, and tax basis:** (As described in the previous section).
- **Connectivity:** Supports combined financial and carbon decision-making, providing meaningful information analysts and investors, and for internal planning & analysis for steering toward decarbonization.
- **Leverages GAAP:** To the extent possible, reasonable and appropriate, generally accepted accounting principles for finance (e.g., IFRS Standards) can be applied for treatment of emissions data. For example, manufacturers already apply rigorous product cost accounting under IFRS to allocate factory overheads and depreciation into products to precisely determine their true cost. The same mechanisms can be leveraged for precisely determining product carbon footprint contribution.
- **Accountability:** Emissions not transferred to customers (e.g., because they are not directly attributable to products/services) accumulate on the balance sheet, ensuring companies remain accountable. These can then be offset through direct permanent carbon capture, purchase of verified/certified permanent carbon sequestration credits, or otherwise addressed.
- **Feasibility:** Integration with existing financial accounting processes and systems reduces the overall effort to implement.
- **Audit synergy:** Established audit procedures over financial controls (e.g., allocation methods) can extend to emissions data.

While this approach still relies on mass adoption to reduce upstream estimation challenges, integration with existing financial accounting methods and systems significantly increases feasibility, and SAP are well-equipped to pursue this integration with SAP Green Ledger.

SAP GREEN LEDGER KEY FEATURES

04

SAP Green Ledger aspires toward end-to-end carbon management that both satisfies evolving regulatory requirements and informs sustainable decision-making across all levels and processes.

Financial Data Integration

Understanding financial implications of changing carbon prices and identifying opportunities to decarbonize requires connectivity between financial and GHG data.

This transition starts with posting carbon-only transactions against financial dimensions (e.g., Company Codes, Profit/Cost Centres, G/L accounts, Materials). Adopting financial data structures, processes, and controls achieves a level of rigour and connectivity absent in traditional GHG reporting solutions. It creates a foundation for dual-axis management reporting, and planning & budgeting, on which carbon budgets can be assigned (e.g., at a Cost Centre level).

Disclosure Requirements and Quantifying Uncertainty

To satisfy mandatory disclosure requirements, SAP Green Ledger will capture CO_2e emissions by GHG scope category. This "layering" of categories will flow throughout the end-to-end accounting treatment for maximized traceability and can ultimately flow through the entire value chain, if all parties adopt the same approach.

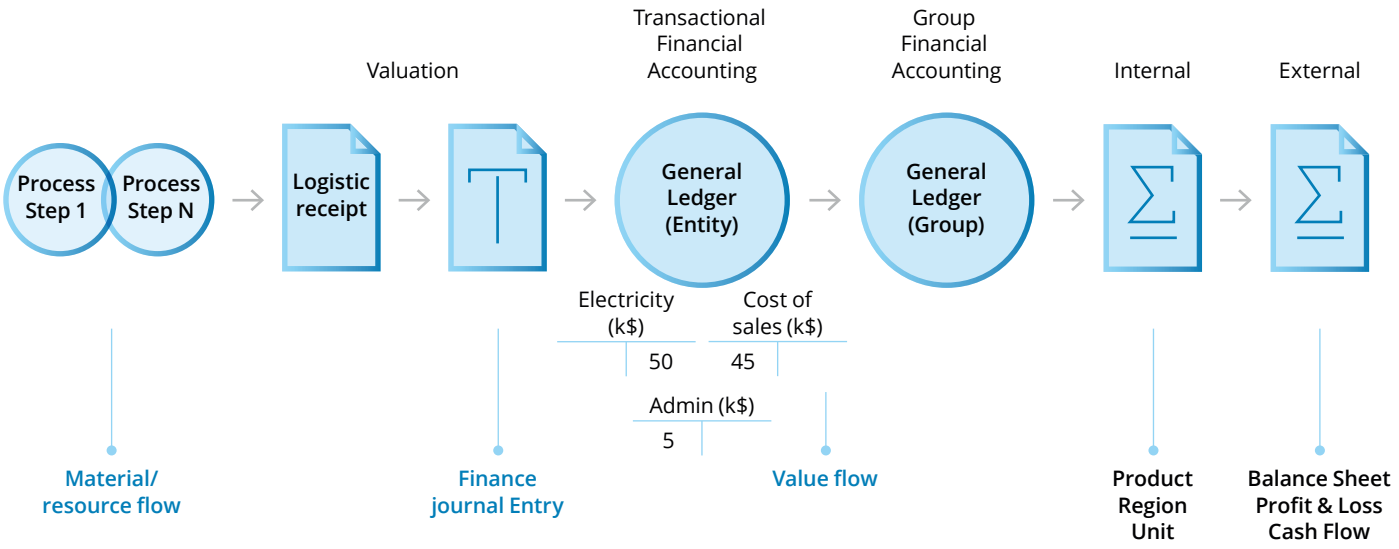
SAP Green Ledger must also record and aggregate indicators of data uncertainty. Qualitative information will be captured, such as whether the emission was measured, calculated, or derived from industry averages or proxies, what emission factor was applied, and from which source. Independent verification/ certification status will also be recorded.

Aggregated quality indicators (e.g., percentage of verified or primary data within the total footprint) will provide a mechanism to trace data quality throughout the value chain, facilitating the shift from spend-based estimations (averages) to certified activity-based data (actuals).

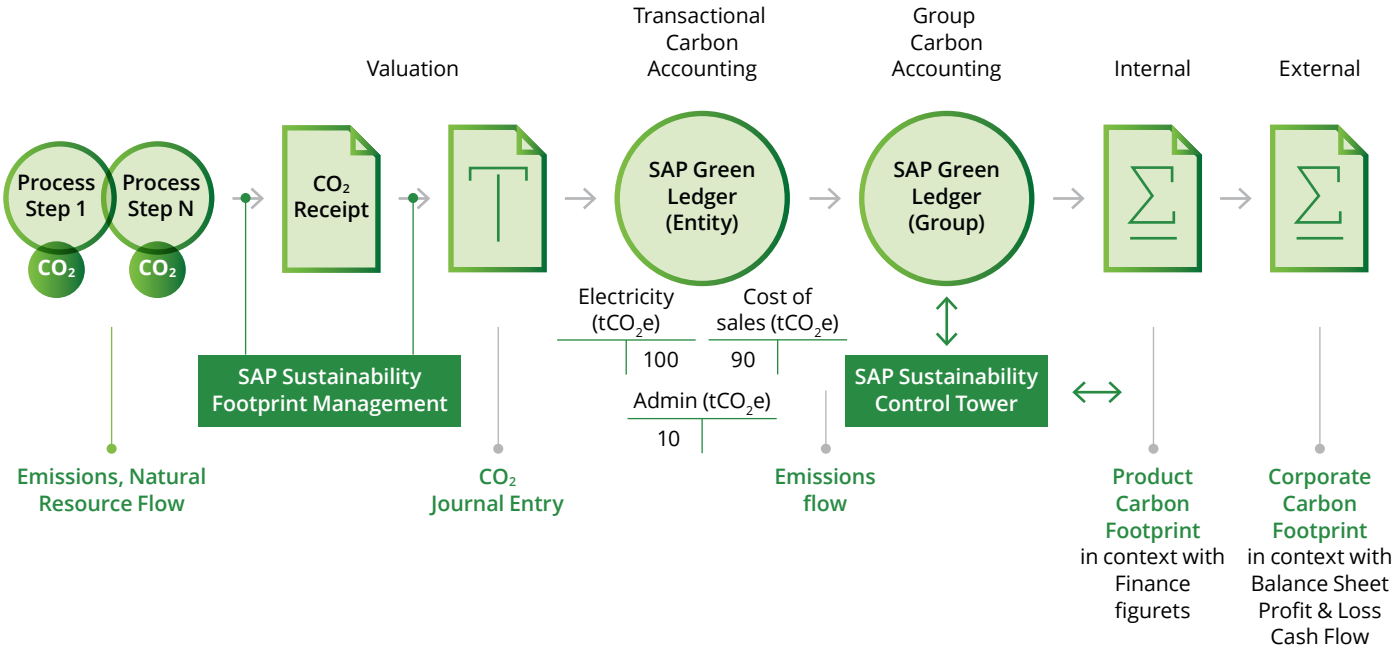
Adopting financial data structures, processes, and controls achieves a level of rigour and connectivity absent in traditional GHG reporting solutions.

SAP Green Ledger Key Features – Financial Data Integration

Finance Accounting Practices based on Document Principle and General Journal



Sustainability Accounting Practices based on Document Principle and Green Ledger



Source: SAP SE, 2024.

Future Direction

The evolution of SAP Green Ledger will be driven by carbon subledgers. Embedded in the S/4HANA Universal Journal, these will directly enrich financial journals with associated emission quantities. The carbon subledgers will generate automated and synchronised financial and GHG transactions, drastically reducing manual effort while increasing data integrity. More complex finance scenarios (e.g., product costing, driver-based allocations) can be applied to emissions data, providing end-to-end auditability to resulting balances.

Future Vision

In the future, the SAP Green Ledger will further evolve to help address more complex scenarios (e.g., carbon credits, pricing and trading). AI will add efficiency to emissions data collection, processing and analysis.

Ultimately, the foundational concepts and data model can be extended to other sustainability dimensions (e.g., water, waste), truly redefining the 'R' in ERP.

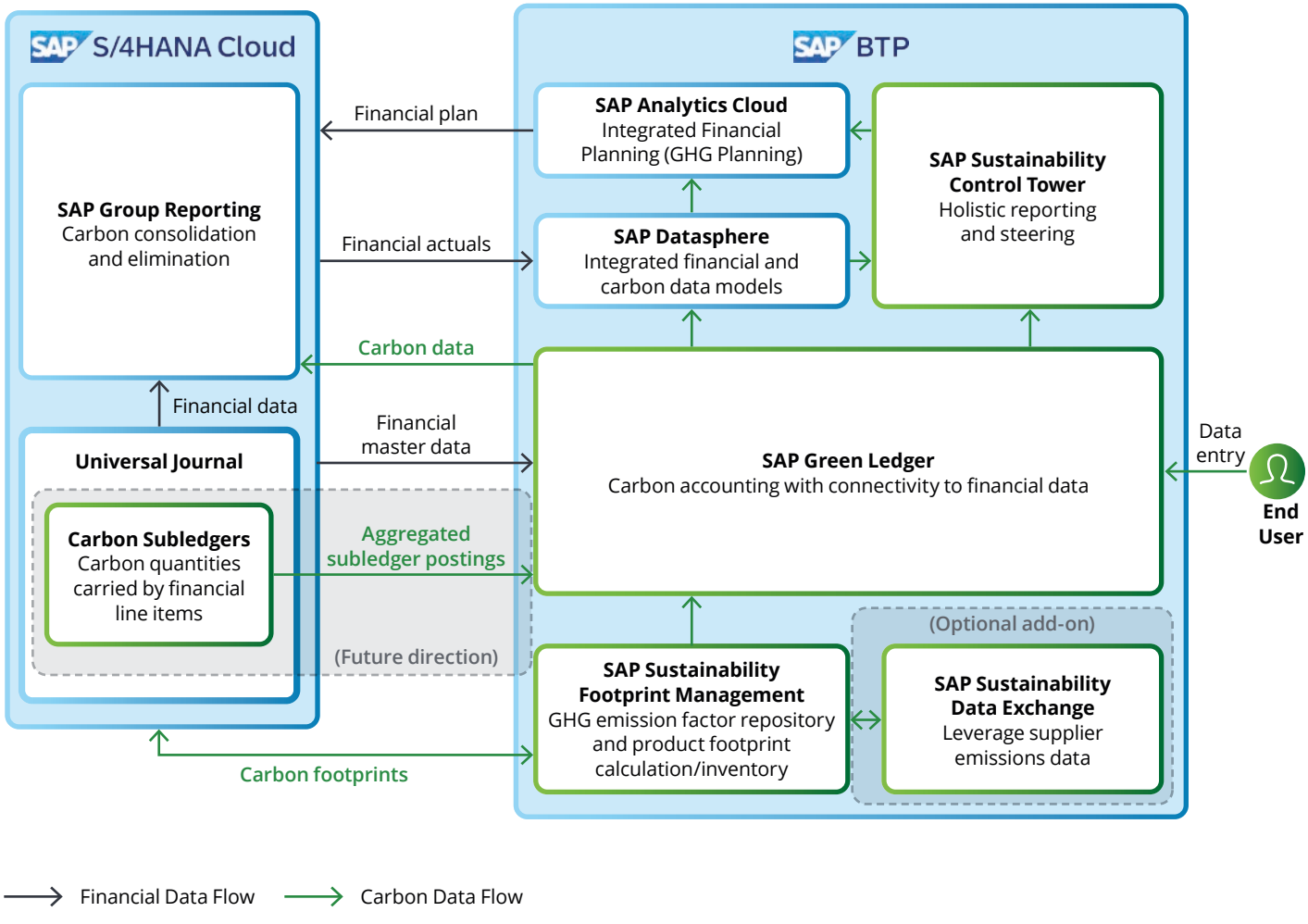
More complex finance scenarios can be applied to emissions data, providing end-to-end auditability to resulting balances.

SAP GREEN LEDGER IN THE SAP SUSTAINABILITY SUITE

05

SAP Green Ledger is the beating heart of the future SAP sustainability architecture, integrating with S/4HANA and existing SAP sustainability products to create a comprehensive solution for all aspects of end-to-end carbon management.

SAP Green Ledger Architecture



While the core carbon accounting will be performed in SAP Green Ledger, **SAP Sustainability Footprint Management** will retain a distinct role for calculation and management of corporate, value chain and product footprint data. This includes ingestion of emission factors from LCA providers and product footprints directly from suppliers through **SAP Sustainability Data Exchange**. SAP Sustainability Footprint Management will act as a footprint inventory, publishing calculated footprints to S/4HANA, to inform business users in real-time and influence decision-making.

While the core carbon accounting will be performed in SAP Green Ledger, SAP Sustainability Footprint Management will retain a distinct role for calculation and management of corporate, value chain and product footprint data.

SAP Sustainability Data Exchange provides a data-sharing platform for suppliers, customers, auditors, and certifiers to exchange accurate and verified product footprint data and is built on interoperability standards established by the WBCSD Partnership for Carbon Transparency (PACT).

SAP Sustainability Control Tower provides a harmonized view of sustainability performance, incorporating enterprise, financial and ESG data from across the sustainability product suite. Management dashboards help visualize ESG performance against targets and support decision-making.

GHG Emission Planning (based on Integrated Financial Planning for SAP S/4HANA) in **SAP Analytics Cloud** enables CO_2e planning against financial plan data with predictive forecasting and what-if scenario modelling. The planning model allows the impact of CO_2e emissions to be simulated based on various drivers, such as emissions in raw materials or energy sources, helping companies identify areas for action.

THE PATH TO GREEN LEDGER

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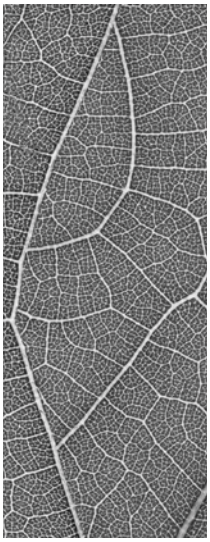
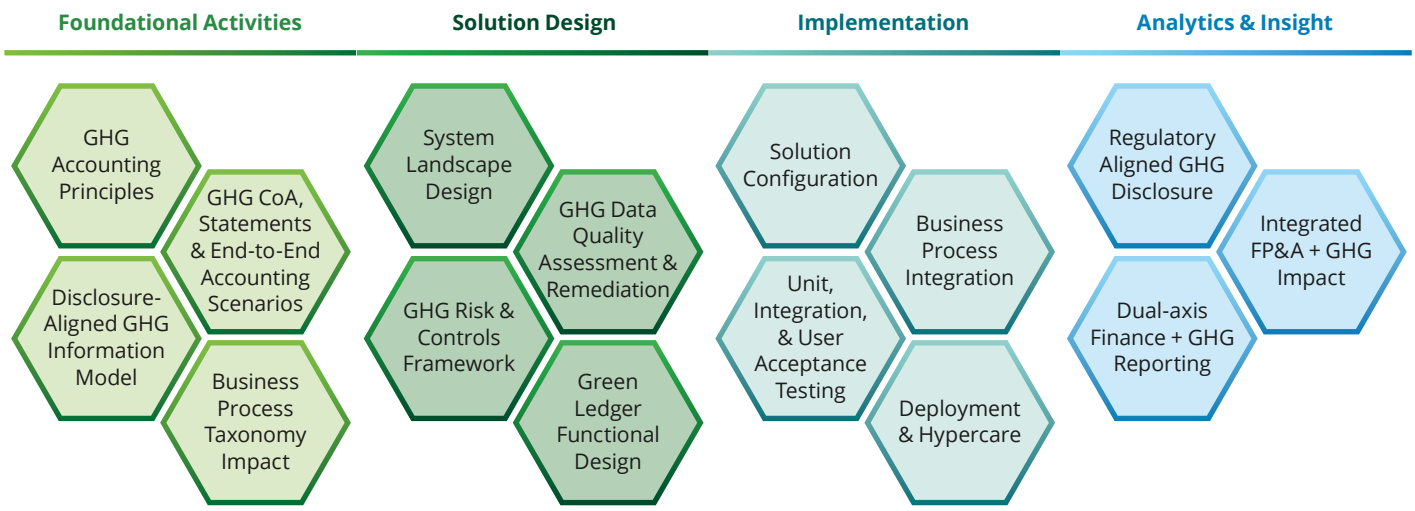


Realizing end-to-end carbon management in SAP Green Ledger, underpinned by robust processes and controls, requires several preparatory steps. Deloitte's 'Green Ledger Pathway' methodology creates the foundation for a sophisticated GHG ledger solution.

Deloitte Green Ledger Pathway: Think Big, Start Small, Scale Fast



Aligned to Deloitte's Sustainable Value Map[32] and Sustainable by Design[33] approach to SAP implementations, Deloitte has developed 'Green Ledger Pathway', a structured methodology to achieve the key prerequisites for implementing SAP Green Ledger. This considers all aspects of GHG accounting, leveraging the breadth of Deloitte's multi-disciplinary model.

Deloitte's GHG accounting working model brings to life key concepts and help visualize combined financial and emission flows for core business processes. The output informs key design decisions for GHG accounting principles and methods, information and operating models, and business process integration.

Key features of Deloitte's Green Ledger Pathway methodology:

01. Define **GHG accounting principles and methods** in alignment with, but not limited by, current standards.

02. Perform an impact-assessment of the **Chart of Accounts** (CoA), and design modifications to accommodate GHG accounting treatments, including:

    - Review of existing G/L accounts for relevance to GHG accounting
    - Introduction of required GHG-only accounts
    - Definition and account mapping of the GHG Flow statement
    - Application of different accounting scenarios to ensure robustness.

03. Map the newly defined accounting model to existing **regulatory disclosure requirements** (e.g., alignment to GHG scope categories).

04. Perform a **business process taxonomy** X-ray, to analyse underlying transactions for relevance to GHG accounting and establish the integrated finance and emission information model.

05. Once the GHG accounting theoretical foundation is established, position SAP Green Ledger within the existing **system architecture**. This exercise includes mapping system roles/functions to the process, highlighting prerequisite SAP or third-party systems, integrations, and technical infrastructure.

06. Extend the **risk and controls framework** to cover GHG data and processes (e.g., segregation of duties, workflow-driven processing), aligned to the COSO Framework for Sustainability Reporting[34]. This ensures reliance can be placed on the operating control environment for future-proofed and cost-effective reasonable assurance.

07. Perform an **emissions data quality assessment and remediation**. Other data considerations include initiation of the balance sheet from a GHG inventory perspective.

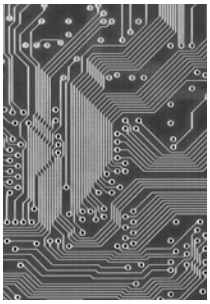
08. The **system implementation** itself closely follows the structure and phasing of an ERP transformation, with programme assurance to govern successful delivery and maximize benefits.

Deloitte's Green Ledger Pathway offers a comprehensive approach to preparing for a SAP Green Ledger implementation. The structured methodology helps companies establish a robust GHG accounting foundation and integrate it into their existing system architecture, supporting their sustainability goals with decision-useful insights, while facilitating compliance with regulatory disclosure requirements.

DELOITTE AS YOUR SAP + SUSTAINABILITY ADVISER

07

Deloitte guides companies towards sustainable business across several domains, specializing in the development of technology-led sustainability solutions.



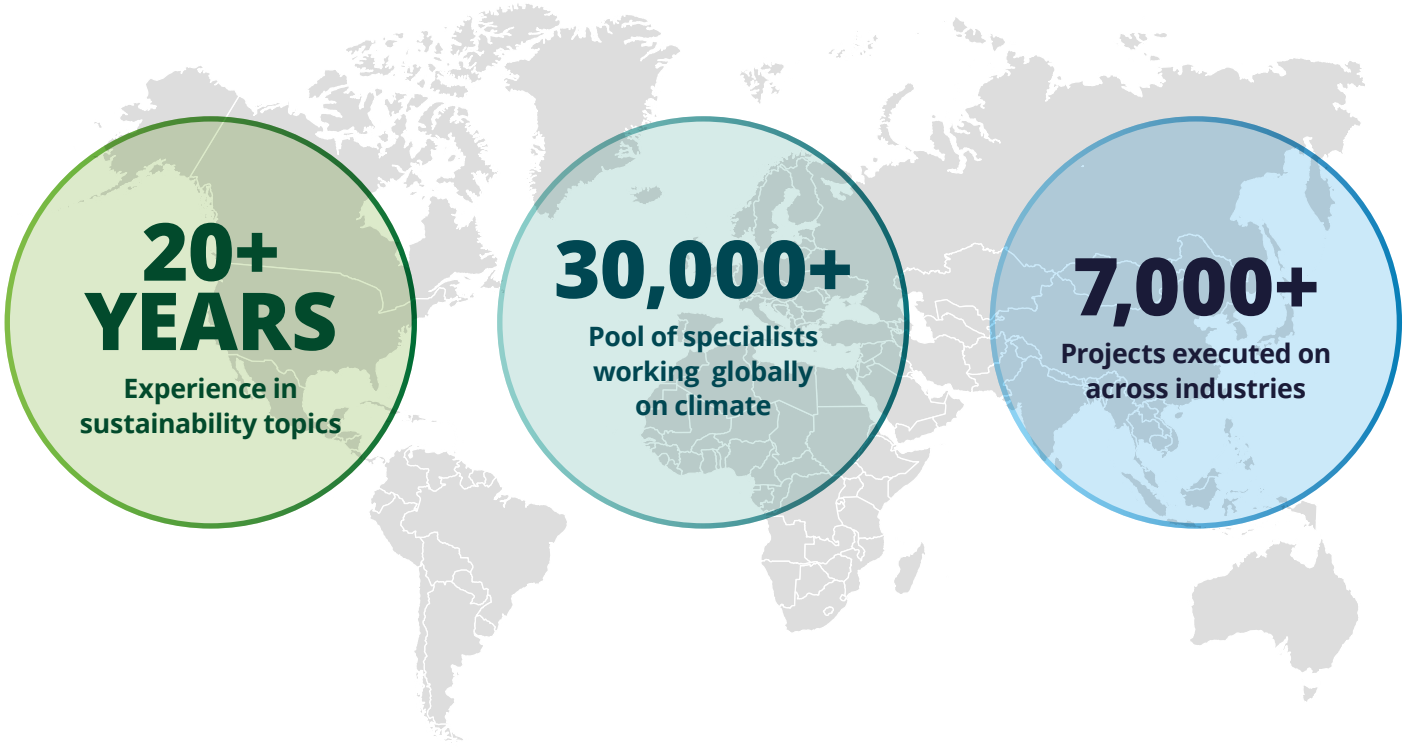
Leveraging Deloitte's specialist knowledge and trusted relationships with prominent scientific institutions, policy makers, and NGOs, Deloitte is uniquely positioned to address upcoming sustainability regulations with forward-thinking solutions. Deloitte's influential voice is heard across numerous sustainability platforms, including the World Economic Forum, Climate Governance Initiative, and the United Nations Global Compact.

Recognized as a leader across several sustainability domains including decarbonization, energy transition, and the circular economy, in the Verdantix 2023 Green Quadrant: Climate Change Consulting[35] market assessment, Deloitte topped the list for vision, strategy, and innovation.

A recognized world-class leader

- We deliver Sustainability & Climate services in **150+ countries and territories** where Deloitte is present.
- Recognized amongst the **Leaders/Specialist quadrant** for Sustainability Consulting in **Verdantix 2023** global survey.
- Pairing SAP Consulting specialist knowledge with Sustainability, Risk Advisory, Compliance, Legal and Tax for **holistic solutions**.

Leveraging combined SAP and Sustainability expertise, Deloitte helps organizations to embed sustainability goals into core operations. Deloitte's Sustainable by Design[33] approach to SAP-enabled transformations is propelled by a global network of SAP and ESG specialists.



Our SAP practice at a glance

As one of SAP's leading Global Service Partners, with a relationship dating back to 1989, Deloitte has helped more than 3,500 clients efficiently enable SAP solutions and realize business value from those investments.

Deloitte's unwavering commitment to excellence is underscored by over 150 international awards earned in the past seven years alone, including a record five SAP Pinnacle awards[36] in 2023, more than any other SAP Partner.

AMERICAS
196,500 professionals
216 offices

EMEA
127,760 professionals
427 offices

APAC
87,680 professionals
144 offices

29,000 SAP practitioners worldwide	**850+** S/4HANA implementations	**550+** Live S/4HANA clients	**350,000** Hours spent with SAP on co-innovation development	**500+** Specialist Tax SAP professionals global	**411,950+** Global professionals SAP professionals global
7,000 Projects completed in last 8 years	**1M** (Certified to Serve) SAP S/4HANA training hours since 2015	**25** SAP pre-configured solutions	**490+** SAP bots, accelerators & BTP assets	**35** Global delivery centres	**22** Global delivery centers
Zero Escalations	**10%** Of our fees generated from SAP services	**6,000+** Hyperscale certifications	**>3,500** Integration implementations	**7,250** SAP-Enabled Change Practitioners	**150+** Countries and territories served
					49 Global digital studios

SAP Pinnacle Awards 2023 Winner

S/4HANA Partner of the Year for five of the last six years. 15 SAP Pinnacle Awards in the last four years – more than any other SAP Partner

Gartner
#1 Globally in consulting

- Global leader in SAP Implementations
- A visionary in SAP Application Management Services

FORRESTER®
#1 Globally in consulting

- Global leader in SAP Services
- Global leader in Business Transformation Consulting

LET'S TALK

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ENDNOTES

* The SEC voluntarily stayed (suspended) the effective date of the final rule pending judicial review of petitions challenging it. The stay does not reverse or change any of the final rule's requirements, but it is uncertain whether the SEC will retain or extend the final rule's existing mandatory compliance dates.

† Whether all emissions, including those associated with corporate functions (not attributable to products/services, e.g., executive flights to a conference) should be embodied and transferred to customers is a topic of debate.

‡ For cradle-to-gate emissions, both the GHG Protocol and E-Liability approaches cover all direct and upstream indirect emissions and calculate product footprints for communication to customers. Whether the footprint is fully transferred to the customer (to avoid double-counting), or remains on the company's books to retain record of their culpability, is inconsequential to the reporting of scope 1, 2, and upstream scope 3 emissions, though avoiding double-counting is desirable in any accounting system.

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