inFOCUS

A PUBLICATION OF:
HAEE
HELLENIC ASSOCIATION *for* ENERGY ECONOMICS

ISSUE #08
JANUARY
2026

Behind the Abbreviations: Decoding the EU Sustainable Finance Framework – from ESG to CSRD, SFDR, ESRS, and the Omnibus Puzzle

TOPICS

IN FOCUS

ISSUE #08 | JANUARY 2026

Behind the Abbreviations: Decoding the EU Sustainable Finance Framework – from ESG to CSRD, SFDR, ESRS, and the Omnibus Puzzle

HAEE
HELLENIC ASSOCIATION
for ENERGY ECONOMICS

Editors-in-chief

Prof. Dr. Kostas Andriosopoulos
BoD Member

Prof. Spiros Papaefthimioy
President

Authors

Konstantinos Sfetsioris
Senior Project Manager

Ilias Tsopelas
Research Associate

Georgia Giannakidou
Research Associate

Contents

Executive Summary

The European sustainable finance ecosystem has expanded and evolved rapidly over the past five years, reaching an unprecedented level of regulatory complexity. Companies, financial institutions, investors and policymakers now operate within an integrated—increasingly data-driven—architecture that combines reporting, due diligence, classification, assurance and financial product regulation. Acronyms such as CSRD, ESRS, SFDR, EU Taxonomy, CSDDD, and the recently proposed Omnibus adjustments have become central pillars of the system, yet their meanings, interlinkages and operational implications often remain opaque to non-specialists.

This glossary is designed to provide a clear, structured and authoritative reference guide to the terminology underpinning the EU Sustainable Finance Framework as it stands in late 2025. It explains, in dictionary format, the regulatory instruments, concepts and processes that shape sustainability reporting, due diligence obligations, ESG data architecture, sustainable finance products, investor disclosures and corporate transition planning.

While concise, the definitions are intentionally analytical: each entry explains what the term means, how it functions within the broader system, and why it matters for both real-economy companies and financial market participants. The aim is not merely to decode abbreviations, but to help readers understand the logic and mechanics of Europe's sustainability paradigm—one that increasingly determines competitiveness, risk management, capital access and long-term corporate resilience.

This glossary should be read as a supporting tool for the broader report, enabling readers to navigate its technical content with precision and clarity.

A. Regulatory Foundations	
Term	Definition
CSRD	Corporate Sustainability Reporting Directive. EU directive that requires large undertakings and listed companies in the EU to publish sustainability information (environmental, social and governance) in accordance with European Sustainability Reporting Standards (ESRS), based on the double materiality principle and subject to external assurance.
ESRS	European Sustainability Reporting Standards. Delegated standards adopted under the CSRD which specify detailed disclosure requirements for environmental (E1–E5), social (S1–S4) and governance (G1) topics, including structure, metrics and narrative information to be reported by in-scope undertakings.
Omnibus I (2025 Revision)	Omnibus package on sustainable finance and reporting simplification. Set of legislative amendments proposed in 2025 to simplify and reduce administrative burdens in EU sustainability rules (including CSRD, CSDDD and Taxonomy), notably by raising reporting thresholds, reducing mandatory datapoints and postponing or adjusting certain requirements for smaller undertakings.
CSDDD	Corporate Sustainability Due Diligence Directive. EU directive that requires large EU and non-EU companies operating in the EU to identify, prevent, bring to an end, mitigate and account for actual and potential adverse human-rights and environmental impacts in their own operations, those of their subsidiaries and their value chains.
EU Taxonomy	EU classification system that defines when an economic activity is considered environmentally sustainable, based on technical screening criteria and minimum safeguards for six environmental objectives, with the aim of preventing greenwashing and supporting informed sustainable investment.
EU Green Bond Regulation (EUGBR)	EU Green Bond Regulation / European Green Bond Standard. Regulation establishing a voluntary "European Green Bond" (EuGB) label and a common framework of rules for green use-of-proceeds bonds whose proceeds finance environmentally sustainable activities as defined in the EU Taxonomy, including requirements on allocation, reporting and external review.
EU Benchmark Regulation	EU regulation on indices used as benchmarks, which among other things creates EU Climate Transition Benchmarks (CTB) and EU Paris-aligned Benchmarks (PAB) and sets minimum standards to align such benchmarks with greenhouse-gas reduction and decarbonisation objectives.
SFDR	EU regulation that lays down harmonised rules for sustainability-related disclosures by financial market participants and financial advisers at entity and product level, in order to improve transparency on sustainability risks and impacts and to support comparability of financial products.

B. Assurance, Materiality & Governance	
Term	Definition
Limited Assurance	A form of assurance engagement in which the practitioner obtains a limited level of assurance, concluding that nothing has come to their attention that causes them to believe the sustainability information is materially misstated. Under the CSRD, sustainability reporting is subject initially to limited assurance by a statutory auditor or audit firm, based primarily on inquiries, analytical procedures and limited evidence-gathering.
Reasonable Assurance	A higher-level assurance engagement in which the practitioner obtains sufficient, appropriate evidence to express a positive conclusion on whether sustainability information is free from material misstatement. Under the CSRD, reasonable assurance is foreseen as a future stage following limited assurance, but its application has been postponed under the 2025 Omnibus adjustments.
Double Materiality	A framework requiring undertakings to assess sustainability matters through two complementary dimensions: 1. Impact materiality – the actual or potential impacts of the undertaking on people and the environment; and 2. Financial materiality – how sustainability-related risks and opportunities affect the undertaking's financial position, performance and cash flows. A topic is material if it is material under either dimension; disclosures are required for all material matters.
Impact Materiality	Dimension of double materiality referring to material actual or potential positive or negative impacts of the undertaking on the environment and people, including impacts through its own operations and value chain, assessed in terms of scale, scope, irremediability and likelihood as set out in ESRS.
Financial Materiality	Dimension of double materiality referring to sustainability-related risks and opportunities that could reasonably be expected to affect the undertaking's cash flows, development, performance, position or cost of capital over the short, medium or long term, as defined in ESRS.
Value-Chain Data	Sustainability-related data covering the undertaking's upstream and downstream value chain (e.g. suppliers, logistics, contract manufacturers, distributors, users), required where relevant for the assessment and reporting of impacts, risks and opportunities
ESG Data Architecture	The organisational, process and IT set-up for collecting, storing, processing, controlling and reporting sustainability data (e.g. systems, data models, workflows, controls) necessary to produce CSRD/ESRS-compliant, assurance-ready sustainability information.
Data Lakes / ESG Data Tanks	Central repositories used to store large volumes of structured and unstructured data, including ESG and sustainability information from across the undertaking and its value chain, to support reporting, analysis and assurance.
Scenario Analysis	Forward-looking modelling for climate/transition risk exposure.
Carbon Pricing / ETS	Carbon pricing: policies that put an explicit price on greenhouse-gas emissions (e.g. taxes or emissions trading systems). EU ETS: the EU Emissions Trading System, a cap-and-trade scheme in which emission allowances are traded, used as an input for transition-risk modelling and climate-related financial assessments.
PPAs (Power Purchase Agreements)	A long-term contract between an electricity producer and a buyer (a utility or corporation) to purchase a specific amount of power over a set period at a negotiated price. This is common in the energy sector for both traditional and renewable energy projects.

C. Investors, Ratings & Market Infrastructure	
Term	Definition
ESG Ratings Regulation	Proposed EU regulation on the transparency and integrity of ESG rating activities. Establishes requirements for ESG rating providers regarding authorisation, supervised by ESMA, governance, and disclosure of methodologies and objectives, to improve the reliability and transparency of ESG ratings used in financial markets.
MiFID II Sustainability Preferences	Concept introduced in MiFID II delegated acts whereby investment firms must obtain and consider clients' preferences regarding sustainable investments (e.g. Taxonomy-aligned, SFDR sustainable investments, or PAIs) when providing investment advice or portfolio management, and must recommend products consistent with those preferences.
Client Categorisation (SFDR 2.0)	Clear sustainability labels help advisors match products to investor sustainability profiles.
Impact Investing	Investment approach that intentionally targets measurable positive social and/or environmental outcomes alongside financial returns, with performance monitored using agreed impact indicators; recognised within EU sustainable-finance discussions as a distinct strategy alongside ESG integration and exclusion.
Sovereign Wealth Funds (SWFs)	State-owned investment funds or entities that manage national wealth, often derived from commodity revenues or foreign-exchange reserves, and which increasingly allocate capital to sustainable infrastructure, renewable energy and transition technologies as part of long-term investment strategies.

D. Corporate Behaviour, Supply Chains & Due Diligence	
Term	Definition
Supply-Chain Due Diligence	Process through which a company identifies, prevents, mitigates and accounts for actual and potential adverse human-rights and environmental impacts linked to its supply chain and business relationships, as required under CSDDD and aligned with international due-diligence standards.
Human Rights Impacts	Actual or potential adverse impacts on internationally recognized human rights arising from a company's operations or value chain, including impacts related to working conditions, forced or child labour, non-discrimination, freedoms of association, community rights and vulnerable groups, as considered under CSDDD and ESRS social standards.
Environmental Due Diligence	Due-diligence activities focused on identifying, preventing, mitigating and accounting for adverse environmental impacts, arising from a company's operations and value chain, as required under CSDDD and reflected in ESRS E-standards.
Oversight Mechanisms	Governance and procedural tools such as complaints and grievance mechanisms, whistleblower channels, remediation procedures and board-level oversight arrangements that companies must establish to monitor and address human-rights and environmental impacts under CSDDD and related guidance.
Sector-Specific Standards (ESRS)	ESRS sector-specific sustainability reporting standards intended to provide additional, sector-tailored disclosure requirements for certain industries under CSRD; under the Omnibus simplification package their application is being phased and made more targeted to reduce reporting burdens for smaller undertakings.

The EU sustainable finance framework operates as a transmission system that turns real-economy behaviour into information and incentives for financial markets, and then channels capital back to those parts of the economy that align with the Union's environmental and social objectives.

On the real-economy side, companies and asset operators carry out economic activities that may be sustainable or non-sustainable. Three core elements structure how these activities are governed and described. First, the Corporate Sustainability Due Diligence Directive (CSDDD) requires large groups to identify, prevent and mitigate adverse impacts on people and the environment across their value chains. It embeds processes such as risk mapping, stakeholder engagement and remediation into corporate governance, so that negative impacts are systematically managed rather than treated as externalities.

Second, the Corporate Sustainability Reporting Directive (CSRD) obliges large companies and listed SMEs to disclose standardised information on sustainability risks, impacts and opportunities, based on the double-materiality principle. Through the ESRS, firms must quantify emissions, environmental performance, workforce conditions, governance arrangements and transition plans, and must identify what share of their turnover, capital expenditure and operating expenditure is associated with environmentally sustainable activities. These disclosures transform business models into structured, comparable data.

Third, the EU Taxonomy and the European Green Bond Regulation provide the classification and financing rules. The Taxonomy defines which economic activities qualify as environmentally sustainable, and to what extent (e.g. substantially contributing, enabling or transitional). The Green Bond Regulation builds on this by setting criteria for EU-labelled green bonds, so that debt raised under the EUGB label is demonstrably financing Taxonomy-aligned activities. Together, they link CSRD data to eligibility for cheaper, labelled capital: the more an activity meets Taxonomy criteria, the easier it becomes to finance it through green instruments and to present it as "sustainable" to investors.

These obligations generate a continuous flow of sustainability-related information from companies into the financial system. Financial market participants, banks, insurers, asset managers and ESG rating agencies, receive this information alongside traditional financial statements. They use it to assess creditworthiness, price risk, design products and construct indices. ESG ratings regulation, now being rolled out in the EU, aims to increase transparency and methodological robustness in how this information is processed into ratings, recognising that many investors rely on third-party ESG scores when implementing their strategies.

On this basis, the Sustainable Finance Disclosure Regulation (SFDR) governs how investment products are described to the market. Sustainability data drawn from CSRD and classified through the Taxonomy are used to determine whether a fund makes no ESG commitment, merely promotes environmental or social characteristics, or pursues a sustainable investment objective. Under the 2025 SFDR 2.0 proposal, these ideas are sharpened into clearer product categories with minimum thresholds and exclusions, but the essential logic remains: corporate sustainability data are aggregated and transformed into fund labels that signal to investors how far a product goes in supporting sustainability outcomes.

The EU Benchmark Regulation completes this layer by defining the rules for climate benchmarks, such as EU Paris-aligned and Climate Transition Benchmarks. Benchmark providers use Taxonomy and CSRD-type data to weight indices towards lower-carbon and transition-aligned issuers. Funds tracking these benchmarks thereby embed decarbonisation pathways into passive investment strategies.

Finally, at the "last mile" of the system, MiFID II and financial advisors ensure that the labelled products created under SFDR are matched to the sustainability preferences of end-investors. Advisors must ask clients about their appetite for sustainable or transition-oriented investments and then recommend products whose SFDR classification and underlying data are consistent with those preferences. Asset owners, pension funds, insurers, retail savers—thus receive portfolios whose sustainability profile is explicitly linked back to the information originally reported by companies.

The result is a closed feedback loop. Due diligence and reporting rules (CSDDD and CSRD) push companies to understand and improve their impacts. Classification tools (EU Taxonomy and the Green Bond Regulation) determine which activities count as sustainable and can access preferential financing. Financial institutions use this information to construct and label products under SFDR and to design compliant benchmarks. Advisors and asset owners then allocate capital into these products through MiFID-governed processes. Over time, cheaper capital, stronger investor demand and reputational benefits for sustainable activities feed back into corporate strategy, reinforcing incentives to increase the share of Taxonomy-aligned business and to deepen value-chain due diligence under CSDDD.

This is the core logic the figure conveys: real-economy activities generate data; regulation structures that data; financial markets transform it into products and prices; and capital flows, in turn, reshape the real economy.

The Challenge of Compliance with the New EU Sustainable Finance Framework, *Lessons Learned from the First Wave of Implementation*

1.1 The Emergence of a Fully Integrated Regulatory Ecosystem

The period from 2023 to the end of 2025 has marked an unprecedented transformation in the European Union's approach to sustainable finance, corporate transparency and market integrity. What began as a set of loosely coordinated sustainability directives has evolved into a highly integrated regulatory ecosystem, where corporate sustainability performance, financial-market disclosures, supply-chain practices and investor protection form a single, interconnected architecture. The Corporate Sustainability Reporting Directive (CSRD), the European Sustainability Reporting Standards (ESRS), the Corporate Sustainability Due Diligence Directive (CSDDD), the EU Taxonomy and, most recently, the Sustainable Finance Disclosure Regulation reform of 2025 (SFDR 2.0), now operate as a unified system that binds together the real economy and the financial sector.

The first wave of implementation revealed a dual reality. On the one hand, companies faced the largest regulatory expansion in decades: the number of required sustainability datapoints, the breadth of value-chain due diligence, and the need for audit-ready documentation significantly exceeded initial expectations. On the other hand, financial markets increasingly demanded coherence, transparency and comparability, pushing investors, asset managers and financial intermediaries to rely more heavily on corporate sustainability data as part of risk management, capital allocation and product categorisation. What emerges from this interplay is a new compliance environment, one that challenges traditional corporate structures, reporting cultures and risk-governance frameworks.

The 2025 Omnibus reform introduced a recalibration of CSRD and CSDDD scope thresholds, providing partial relief to mid-sized companies while intensifying expectations for the largest multinationals. However, the empirical evidence of the first reporting cycles shows that compliance is no longer driven solely by legal obligations. Instead, compliance has become a condition for market access, financial inclusion, investor credibility and strategic resilience. In this chapter, we analyse the structural, operational and organisational challenges revealed by the first wave of implementation, drawing lessons that shape the future of sustainability governance and reporting in Europe.

1.2 Regulatory Recalibration under the Omnibus Package: **Formal Simplification, Substantive Expansion**

The Omnibus I Package, adopted in late 2025, has become the defining inflection point for understanding the changing nature of compliance. While public discourse emphasised that the reform "simplifies and streamlines" the regulatory landscape, the deeper reality is that Omnibus does not diminish the importance of sustainability disclosure—it merely shifts where and how obligations operate.

The most widely discussed adjustments concerned the narrowing of CSRD scope. Under Omnibus, mandatory reporting applies only to companies exceeding 1,750 employees and €450 million in net turnover, significantly higher than the original 500-employee threshold. CSDDD underwent an even sharper contraction: only firms with more than 5,000 employees and €1.5 billion turnover remain directly in scope. Additionally, the idea of establishing a unified European civil liability regime, one of the most controversial aspects of the original proposal, was abandoned. Sector-specific ESRS standards were rendered optional rather than mandatory, and assurance requirements remain at the level of limited assurance, postponing indefinitely the transition toward reasonable assurance.

Yet, these reductions mask a profound truth uncovered during the first reporting cycle: companies continue to face indirect, market-driven obligations. Large financial institutions remain bound by prudential ESG expectations, by the EU Taxonomy, and, after the November 2025 SFDR reform, by new product-categorisation demands that require evidence of sustainability alignment. As a consequence, even companies outside CSRD/CSDDD scope must still provide reliable sustainability information to customers, lenders, suppliers, insurers and investors if they wish to maintain competitive positions in their markets.

Thus, the lesson is clear: the Omnibus simplifies the legal perimeter, but it strengthens the functional dependence of financial markets on high-quality ESG data. Compliance, therefore, becomes less about formal obligations and more about market necessity. The ability to provide ESG-aligned data becomes a determinant of participation in sustainable finance markets, access to liquidity, attractiveness to institutional investors, and resilience to long-term regulatory tightening.

1.3 The Data Challenge: **Moving from ESG Narratives to Measurable, Auditable Reporting**

The most significant challenge uncovered by the first wave of CSRD reporting is the transition from qualitative sustainability narratives, the norm under voluntary ESG regimes, to quantitative, auditable, decision-useful sustainability metrics. ESRS introduces over 1,200 datapoints across environmental, social and governance domains, with varying levels of granularity, mandatory explanations, methodological notes and external-assurance requirements.

The magnitude of this shift cannot be overstated. For the first time, companies were required not only to describe their sustainability practices but to measure them, document them, assess them through double materiality and submit them to independent audits. Many organisations underestimated the depth of this operational transformation. Sustainability teams accustomed to producing annual ESG brochures suddenly faced the need for:

- systematic data governance;
- traceability and audit trails;
- digital reporting systems;
- methodological consistency;
- precise definitions of boundaries and scopes;
- harmonised data collection across global operations;
- verification-ready documentation for all disclosed metrics.

The first reporting wave revealed three fundamental and recurring data-related challenges.

First, Scope 3 emissions proved to be the single most complex and consequential dataset. The need to capture emissions embedded in upstream suppliers, downstream product use, logistics and waste streams requires advanced modelling capabilities and supplier engagement tools that few companies possessed prior to CSRD. The lack of standardised supplier methodologies led to inconsistencies, data gaps and methodological uncertainties that auditors flagged as significant weaknesses.

Second, value-chain due diligence, required both by CSDDD and by ESRS S1–S4, exposed the reality that many companies lack visibility into upstream labour conditions, environmental impacts or subcontractor structures. The challenge is not just data quantity but data reliability: companies struggled to validate supplier-provided information, particularly in high-risk geographies or fragmented procurement chains.

Third, the transition from manual Excel-based reporting to digitally integrated sustainability reporting systems was uneven. Companies with sophisticated IT infrastructure adapted more easily, while others rushed to implement ESG data platforms mid-cycle, often leading to integration problems, inconsistent version control and weak internal controls.

This emerging evidence suggests that CSRD compliance is not primarily a reporting challenge; it is a data architecture challenge. It requires companies to redesign their information systems, workflows, controls and governance processes to produce sustainability data that is as robust, traceable and auditable as financial data. The complexity is amplified by the interplay with SFDR 2.0, which relies on corporate sustainability data to classify financial products, reinforcing the centrality of ESRS-compliant, assurance-ready information.

1.4 Energy-Market Volatility and Its Impact on ESRS Climate Reporting

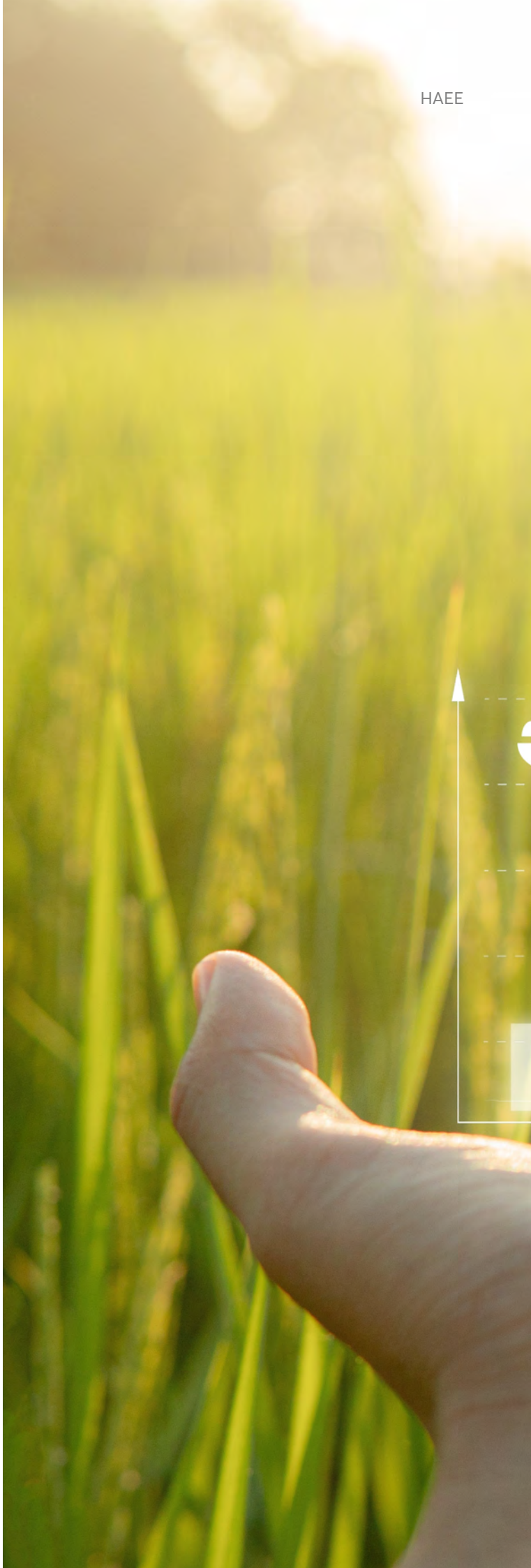
A critical factor shaping the first wave of ESRS climate disclosures was the persistent instability of European energy markets during 2023–2025, as clearly illustrated in the energy-market slide presentation provided. The data reflect a structural pattern of volatility: fluctuating natural gas prices, unpredictable hydrological conditions, intermittency in renewable generation, and substantial variability in CO_2 allowance pricing. Together, these dynamics created a moving target for companies attempting to model transition risks, energy-cost exposures and long-term decarbonisation pathways in compliance with ESRS E1.

Energy-price instability was not a cyclical phenomenon but a systemic feature of the emerging European energy system. The transition toward higher renewable penetration increased sensitivity to weather-driven generation patterns, while ongoing geopolitical pressures and supply-chain fragmentation amplified vulnerability in natural gas markets. These variables complicated the ability of companies to produce stable and internally consistent climate disclosures. ESRS requires organisations to disclose forward-looking energy scenarios, carbon-price assumptions, abatement strategies and sensitivity analyses. Yet with gas prices oscillating sharply and CO_2 allowances underperforming against most forecast curves, companies struggled to anchor climate-transition plans in a coherent economic trajectory.

The slide deck also highlighted the complexities of corporate exposure to long-term Power Purchase Agreements (PPAs). Many companies entered PPAs as part of their Scope 2 decarbonisation strategies, often under the assumption that these instruments would provide cost stability. However, volatility in renewable generation output, increasing frequency of curtailment events and the emergence of negative-price periods introduced contractual risk profiles that were not previously considered in sustainability planning. This created new challenges for ESRS E1 disclosures: companies had to quantify exposure to PPA-related financial risks, reflect them in both financial-materiality assessments and transition-plan modelling, and explain how PPA structures interacted with long-term decarbonisation objectives.

At the same time, the divergence between expected and actual CO_2 allowance prices undermined the robustness of carbon-cost modelling. Companies relying on earlier forecasts found themselves in a situation where their internal carbon-price assumptions no longer reflected market reality. This raised fundamental questions around the credibility of scenario analysis, alignment with science-based pathways, and the defensibility of transition-plan economics under assurance procedures.

The implications for ESRS reporting were substantial. Climate-related disclosures could no longer be based solely on linear extrapolations or long-term assumptions; they required dynamic modelling that incorporated real-time market signals, stress testing of multiple price scenarios and explicit reconciliation of short-term volatility with long-term decarbonisation commitments. Moreover, auditors increasingly demanded methodological transparency and evidence that companies had incorporated market-based data into sensitivity analysis. As a result, the first reporting cycle demonstrated that energy-market volatility is not a peripheral variable — it is a core element of climate-risk disclosure that determines the analytical integrity of ESRS E1 reporting.



Double Materiality in Practice, *How Companies Assess Impacts, Risks and Opportunities Across Environment, Society and the Value Chain*

2.1 Materiality as the Core Analytical Engine of CSRD

Among all elements of the evolving EU sustainable finance architecture, the double-materiality principle stands as the most conceptually ambitious and operationally demanding requirement. Unlike reporting regimes in other jurisdictions, which typically adopt a single materiality lens focused on investor relevance, the EU requires companies to examine sustainability through two equally weighted lenses: impact materiality, which considers how the company affects the environment and society, and financial materiality, which concerns how environmental and social factors affect the company's financial position, performance and cash flows.

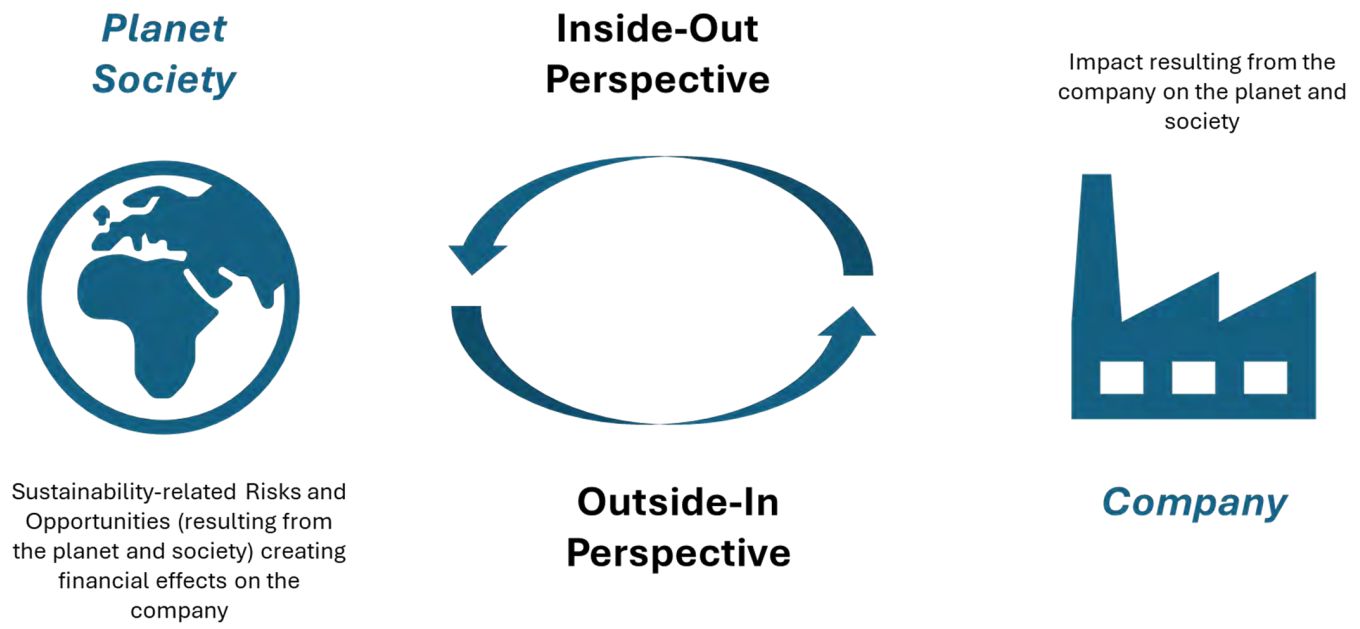


Figure 1: The Concept of Double Materiality

This dual approach forces corporations to confront their sustainability exposure in a comprehensive manner. The double-materiality assessment is not a disclosure exercise; rather, it is a strategic diagnostic process that shapes the entirety of CSRD reporting. It determines which ESRS standards apply, which data must be collected, how the company prioritises sustainability issues, how governance bodies engage with risks and impacts and how transition strategies are developed and justified. In practice, it is the analytical engine through which all other sustainability obligations flow.

The first wave of implementation revealed that double materiality is far more complex than originally expected. Many companies initially approached the process as an extension of conventional materiality assessments used in voluntary ESG reports. They quickly discovered, however, that ESRS demands a far more rigorous, evidence-based and auditable methodology that includes stakeholder consultations, value-chain mapping, quantification of impact severity, scenario analysis and multidisciplinary financial-risk modelling. The early experiences of 2024–2025 demonstrated that companies struggled not because the concept was unclear but because operationalising it required capabilities that many organisations did not yet possess.

2.2 Conceptual Structure of Double Materiality under ESRS

Double materiality under ESRS is governed by a precise methodological framework. It requires enterprises to evaluate a wide universe of sustainability topics across environmental, social and governance domains and determine which ones are material under one or both lenses. Materiality does not arise merely from stakeholder interest or reputational concerns; it must be grounded in demonstrable evidence, structured evaluation and documented reasoning.

The ESRS framework requires companies to analyse over 180 sustainability subtopics, each associated with multiple impacts, dependencies, risks and opportunities. These topics must be evaluated against criteria that include severity, scope, likelihood, financial magnitude and time horizon. The output of this systematic process is a materiality matrix that identifies topics that are:

1. Impact-material only,
2. Financial-material only, or
3. Double-material, meaning material under both lenses.

Only topics identified as material—particularly double-material ones—trigger mandatory disclosures under ESRS.

This framework forces companies to break away from simplistic or superficial sustainability prioritisation methods. A topic that seems immaterial under financial metrics may be materially significant under impact criteria, and vice versa. For instance, biodiversity impacts may exhibit high impact materiality due to irreversible ecological harm even if short-term financial risks appear limited. Conversely, transition risks associated with carbon pricing may have high financial-materiality implications even when the company's direct emissions footprint appears modest.

Double materiality thereby becomes an integrative tool: it reconciles short-term financial perspectives with long-term societal and environmental considerations, creating a unified view that underpins both corporate strategy and regulatory compliance.

2.3 Impact Materiality: Assessing Outward Effects on People and the Environment

Impact materiality demands that companies examine how their activities, products and value chains affect the environment and society. It requires a rigorous, structured assessment of whether impacts are actual or potential, positive or negative, and direct or indirect. ESRS prescribes a methodology that evaluates impact severity based on scale, scope and irremediability, combined with the likelihood of occurrence.

In practice, this means companies must identify environmental impacts such as greenhouse-gas emissions, air and water pollution, land degradation, biodiversity loss, deforestation, waste generation and resource depletion. On the social side, impact materiality includes labour rights in the supply chain, occupational health and safety, community impacts, human-rights risks, consumer safety and data privacy.

The first wave of implementation showed that organisations underestimated how many topics qualify as impact material when supply-chain information is taken into account. In particular, companies discovered that value-chain impacts—upstream or downstream—often reveal high-severity impacts even when direct operations appear low-risk.

For example:

- Consumer products companies found that downstream product use and end-of-life disposal created significant environmental impacts.
- Manufacturing firms discovered that upstream suppliers generated substantial emissions and social risks that were attributable to their procurement decisions.
- Technology companies faced high-impact materiality in data privacy and algorithmic bias despite low environmental footprints.

Assurance providers demanded detailed documentation demonstrating how each impact was identified, assessed, prioritised, and validated. Many organisations had to revise their materiality assessments multiple times during the assurance process because impact-severity calculations lacked sufficient evidence or because the rationale for excluding certain impacts was poorly justified.

Impact materiality, therefore, proved to be more than a normative requirement; it became a due diligence instrument, particularly for companies exposed to CSDDD. The alignment between double materiality and the due-diligence obligations under CSDDD reinforced the necessity of supply-chain transparency, human-rights traceability and systematic impact monitoring. Companies that lacked visibility into their suppliers were unable to complete a defensible impact-materiality assessment and faced assurance challenges as a result.

2.4 Financial Materiality: Evaluating Sustainability-Related Financial Risks and Opportunities

Financial materiality requires companies to analyse how environmental and social factors affect corporate financial performance. This includes exposure to climate-transition risks, physical climate risks, regulatory changes, shifts in consumer preferences, technological disruption, supply-chain vulnerabilities and access to capital.

Under ESRS, financial-materiality assessments must incorporate both qualitative and quantitative analysis. Companies must examine how sustainability factors influence revenue streams, cost structures, asset valuations, liabilities, liquidity, insurance premiums, capital expenditures and long-term profitability. Financial materiality must also incorporate scenario analysis, particularly under ESRS E1 for climate change, using scientifically grounded transition pathways and climate-risk projections.

The first reporting cycle revealed that financial-materiality analysis was one of the biggest challenges. Many organisations lacked the modelling capabilities required to estimate long-term financial effects of climate and environmental risks. Transition risks associated with carbon pricing, regulatory tightening, supply-chain adaptation and shifts in consumer demand required sophisticated modelling frameworks more typical of financial institutions than corporates.

Energy-market volatility, as depicted in the slide deck you provided, further complicated financial-materiality assessments. Companies struggled to determine how fluctuating gas prices, variable renewable-energy output, inconsistent hydrological conditions and unexpected CO_2 allowance behaviour would influence long-term financial exposure. Some firms underestimated the magnitude of transition risks, while others produced overly conservative estimates that were not aligned with market data.

Auditors, in turn, scrutinized the assumptions underlying financial-materiality assessments, requiring evidence of methodological rigour, data sources, scenario selection, sensitivity analysis and internal governance review. Companies learned that financial-materiality analysis is not a forecasting exercise; it is a risk-modelling discipline requiring cross-functional collaboration between sustainability experts, finance teams, risk managers, procurement specialists and energy-market analysts.

2.5 The Materiality Matrix: Mapping Converging and Diverging Topics

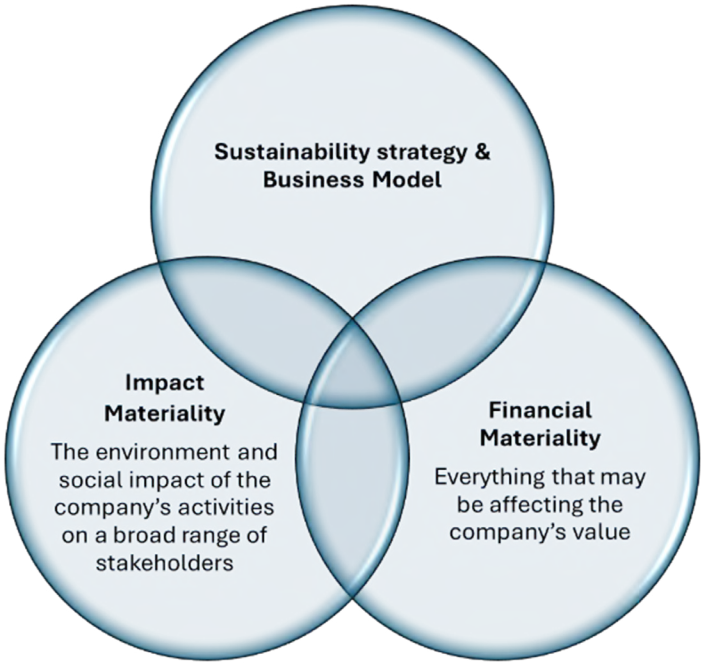


Figure 2: Core Dimensions of Double Materiality

The outcome of double materiality is a company-specific materiality matrix that identifies which sustainability matters trigger ESRS disclosures. This matrix must be supported by documented evidence, stakeholder input and governance sign-off. The matrix reveals the relationship between impact and financial materiality, indicating where topics converge and where they diverge.

In practice, companies found that certain environmental topics, such as climate change, energy use and pollution, commonly appeared as double-material. Biodiversity impacts also emerged as double-material in sectors with land-intensive value chains, even when companies had not previously considered biodiversity a priority. Social topics showed more variation, with labour rights, supply-chain conditions and community impacts frequently reaching impact materiality but not necessarily financial materiality unless linked to regulatory or operational risks.

The double-materiality matrix also revealed gaps in corporate preparedness. Many organisations initially produced matrices that were too narrow, failing to capture crucial upstream or downstream risks. Assurance providers required several companies to expand or revise their matrices to reflect a more comprehensive understanding of value-chain impacts and financial exposures. The process demonstrated that double materiality cannot be conducted in isolation; it must be embedded within broader due diligence, risk management, and stakeholder engagement frameworks.

2.6 Value-Chain Assessments and the CSDDD Interdependency

One of the clearest lessons from the first implementation cycle is that double materiality is structurally intertwined with the Corporate Sustainability Due Diligence Directive (CSDDD). Impact-materiality assessments often rely on the same datasets, methodologies and supply-chain evidence required under CSDDD. Conversely, financial-materiality assessments depend on identifying operational, regulatory, and reputational risks that also emerge through the due diligence process.

This interdependency forced companies to strengthen supply-chain mapping, supplier engagement, grievance mechanisms and risk-based screening. Without robust value-chain insight, companies cannot credibly identify impacts or model financial risks. This became particularly evident in sectors characterised by complex, multi-tier supply chains such as electronics, apparel, agriculture and automotive manufacturing.

Even though the 2025 Omnibus reform narrowed the scope of CSDDD, the market expectation for value-chain transparency did not diminish. Large buyers, those still in scope, began imposing contractual obligations on their suppliers to provide human-rights, environmental and emissions data. As a result, many companies outside CSDDD's legal threshold still faced practical obligations arising from their position in the value chain. This confirmed that double-materiality assessments are both top-down and bottom-up processes that require systemic engagement across the value chain, regardless of regulatory scope.

2.7 Stakeholder Engagement as an Analytical Requirement

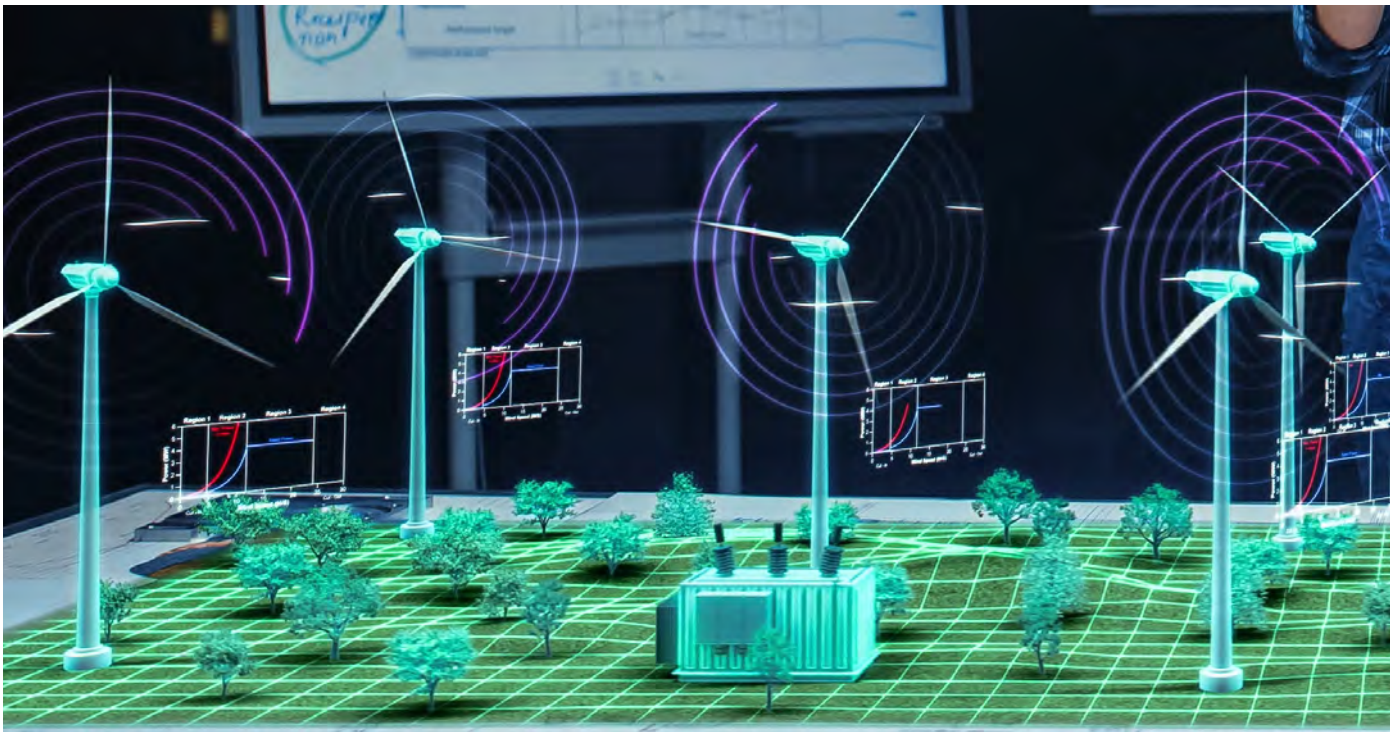
ESRS requires companies to incorporate stakeholder input into the double-materiality process. This requirement significantly complicates the assessment, as companies must consult a diverse array of stakeholders, including employees, suppliers, affected communities, consumers, NGOs, investors, and regulatory bodies. Stakeholder input must be gathered systematically, documented and integrated into the materiality methodology.

The first reporting wave revealed that many companies underestimated this requirement. Stakeholder engagement was frequently informal, anecdotal or insufficiently documented. Assurance providers flagged these weaknesses, leading companies to establish structured stakeholder-engagement frameworks, including surveys, interviews, community consultations, supplier dialogues and formal advisory panels. Properly executed, stakeholder engagement provided companies with critical insight into impact severity, emerging risks and societal expectations.

ESG Data & Digital Reporting, *Technology, Data Architecture and the Digitisation of Sustainability Disclosure*

The first wave of CSRD implementation revealed that the true bottleneck of the European sustainability framework is not conceptual, regulatory or even methodological—it is digital. ESG reporting shifted, almost overnight, from a narrative-based exercise into a data-intensive discipline requiring structured datasets, audit-ready evidence, integrated systems and real-time analytical capabilities. The most advanced companies were those that approached CSRD not as a compliance burden but as a digital-transformation project, recognising that sustainability information must be treated with the same degree of precision, reliability and traceability as financial data. This chapter examines how digital infrastructure, data governance and reporting technologies became the foundation of ESG compliance in the new European framework.

The first structural challenge was the scale and granularity of data required under ESRS. Sustainability datapoints extend far beyond greenhouse-gas inventories, enfolding water withdrawals, pollutant discharge, biodiversity dependencies, diversity ratios, workforce metrics, supply-chain incidents, product-lifecycle impacts, energy-mix composition, Taxonomy alignment and forward-looking transition-plan models. Each disclosure requires clear boundaries, consistent methodologies and source-level documentation. Companies discovered that ad-hoc or manual collection methods were incapable of producing the volume, accuracy and consistency demanded by external assurance. ESG teams accustomed to consolidating spreadsheets found themselves responsible for managing tens of thousands of data entries across multiple business units, subsidiaries and international operations. Large organisations needed to redesign data architecture from the ground up, creating centralised ESG data lakes, integrating sustainability and financial systems and building internal controls aligned to assurance standards.



A second challenge emerged from value-chain data collection, particularly in relation to Scope 3 emissions and human-rights due-diligence indicators. The shift from enterprise-level to ecosystem-level reporting dramatically widened the scope of digitalisation. Companies needed platforms capable of collecting data from suppliers, distributors and contract manufacturers, many of whom lacked structured ESG systems. Supplier-collaboration tools, digital questionnaires, API-based data exchanges and third-party sustainability platforms became essential components of the reporting landscape. Firms that failed to digitalise supplier engagement struggled to produce defensible disclosures, especially in industries with complex and multi-tier supply chains. This created a de facto dependence on digital intermediaries capable of providing emissions factors, validation methodologies and risk-screening algorithms. The accuracy of double-materiality assessments and CSDDD-related disclosures therefore became contingent on the sophistication of digital value-chain tools.

The third dimension of digitalisation concerned real-time and scenario-based analytics. ESRS E1 requires companies to quantify climate-risk exposure, model transition pathways, stress-test regulatory scenarios and reconcile transition costs with capital-expenditure plans. These activities cannot be performed with static tools; they require advanced analytics, often involving machine-learning models, integrated financial-climate simulation platforms and dynamic energy-market databases. The slide presentation you provided highlighted the volatility of European energy markets, fluctuating natural-gas prices, variable renewable output, unexpected CO_2 allowance trajectories. Such instability made it clear that climate modelling must be dynamic rather than static. Companies increasingly turned to digital platforms offering forward-price curves, integrated carbon-budget models and scenario-testing engines aligned with IPCC pathways. These systems allowed organisations to construct transition plans that were both strategically robust and methodologically defensible under assurance.

A fourth aspect involved the digitalisation of internal controls, audit trails and governance workflows. External auditors required evidence not only for final numerical disclosures but also for the processes through which data were generated, reviewed and approved. Companies were forced to establish version-control systems, access-management protocols, automated validation rules, metadata registries and audit trail records. Digital reporting platforms became the backbone of assurance readiness, enabling auditors to trace sustainability metrics from source to disclosure. Where companies relied on manual or semi-structured systems, assurance providers frequently requested re-performance, re-calculation or additional documentation, significantly increasing the burden of the audit process.

Finally, the transformation of SFDR into a product-classification regime amplified the importance of digital ESG reporting. Asset managers required accurate, Taxonomy-aligned, ESRS-compliant corporate data to classify financial products under the new "Sustainable," "ESG Basics" and "Transition" categories. This pushed companies to develop investor-facing ESG reporting portals, data-distribution pipelines and machine-readable reporting formats. The integration of corporate sustainability data into financial-market infrastructures accelerated the creation of European ESG data hubs, digital product passports and emerging XBRL-based reporting taxonomies. As a result, digital ESG reporting shifted from a compliance necessity to a strategic differentiator, influencing access to capital markets, inclusion in sustainable-finance products and credibility with institutional investors.

Sustainable Finance, Green Instruments and the Strategic Role of Financial Institutions

The evolution of sustainable finance entering 2025 reflects a market that is no longer experimenting with ESG and sustainable indices integration but is structurally reorganising around it. Sustainable finance has become a mechanism through which regulatory expectations, investor preferences and corporate strategy co-evolve. The data visualized in the accompanying charts illustrate not isolated facts but the underlying architecture of this transformation. The challenge is not to restate their numbers but to understand the economic rationale that produces these patterns, and to situate them within the broader European sustainable finance framework.

A first observation concerns the sectoral geography of sustainability disclosure. The energy and financial sectors exhibit extremely high levels of ESG reporting across all global regions, while real estate remains structurally under-disclosed. This difference is neither incidental nor purely regulatory. Energy firms sit at the core of global decarbonisation pathways: they face carbon pricing, emissions trading, transition-plan obligations and acute investor scrutiny. Their business models depend on managing regulatory exposure and demonstrating credibility in transition. Financial firms, in turn, require detailed sustainability data to meet their own prudential and market-disclosure obligations.

By contrast, real estate companies, despite their massive environmental footprint, have historically operated under fragmented or weaker disclosure requirements, especially outside Europe. Investors have often priced real estate based on macro cycles, yields and location rather than embodied carbon, energy intensity or climate adaptation exposures. Thus, the asymmetry in disclosure reflects divergent combinations of regulatory pressure, investor expectations and transition risk concentration.

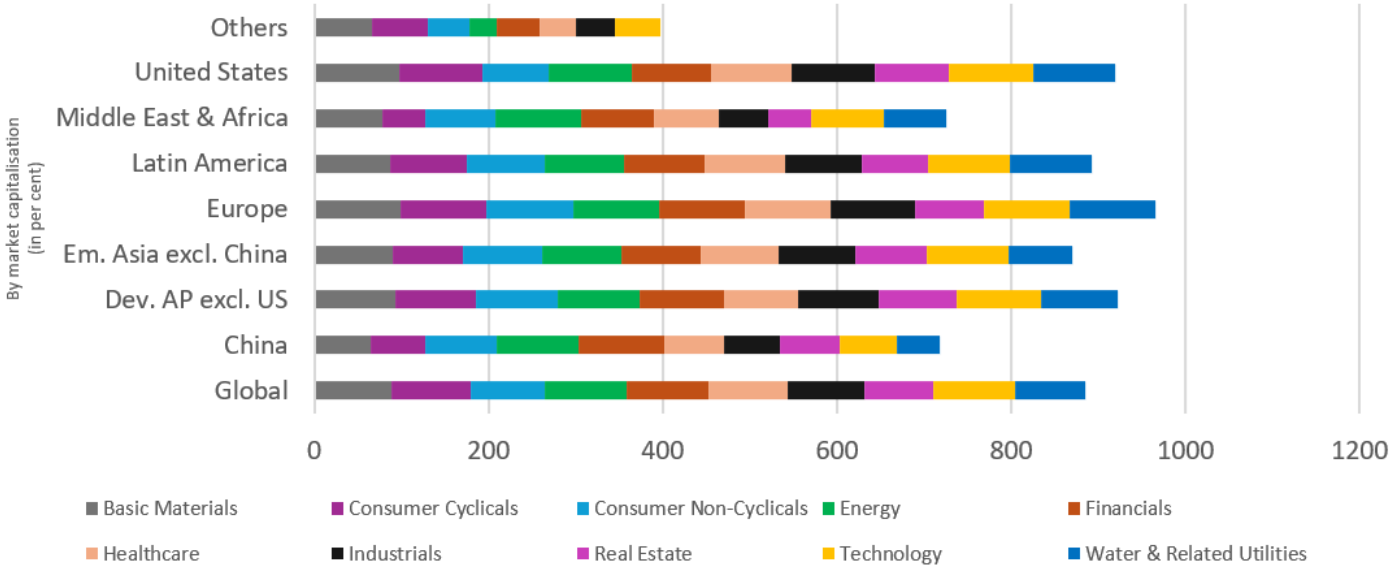


Figure 3: Sustainability Information Coverage by Sector Across Global Regions (2025, % of Market Capitalisation Reporting)
Source: OECD Corporate Sustainability dataset

The second set of insights concerns environmental R&D and low-carbon CapEx disclosure. The small fraction of energy companies reporting such figures reveals a deeper tension in the global transition: most of the technological innovation required for the energy system of 2050 is concentrated in a relatively small group of firms, typically in advanced economies or under state ownership. Many producers, particularly in emerging or resource-exporting regions, operate with business models that are not yet aligned with long-term decarbonisation, and therefore lack incentives to make transition investment transparent. R&D disclosure exposes strategic direction, vulnerability and competitive posture; companies disclose it only when strategically advantageous.

Moving to the capital-demand side, Europe overwhelmingly dominates global ESG fund assets. This is a structural outcome of the EU regulatory system: CSRD, ESRS, the EU Taxonomy and other relevant directives create institutional expectations for sustainability integration across the investment chain. Investors in Europe are required to articulate sustainability preferences; asset managers are required to design products that match those preferences; and financial advisers are required to recommend products based on them. This creates a self-reinforcing ecosystem in which sustainability disclosure is rewarded with investor capital.

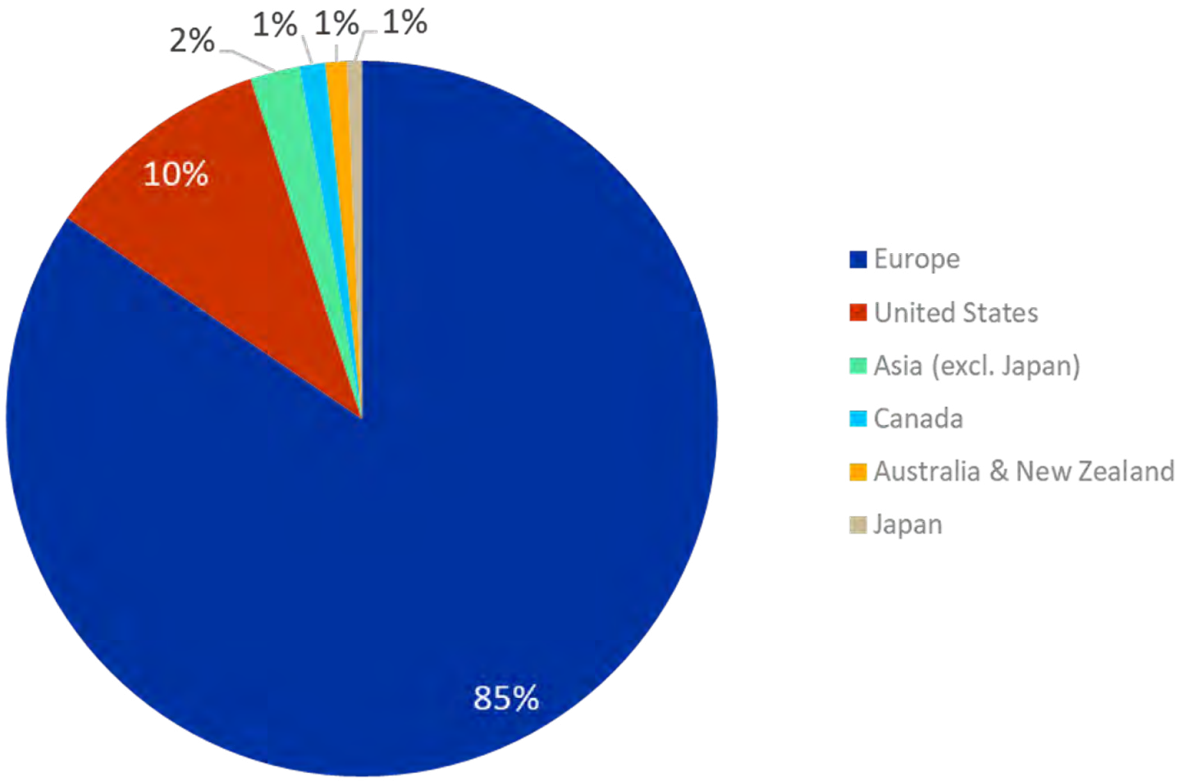


Figure 4: Global Sustainable Investment Assets Under Management (AUM) – Q1 2025, (USD bn, regional breakdown)
Source: Statista

Performance data reinforce this trend: ESG funds do not merely function as "ethical" alternatives but exhibit resilient, competitive return profiles. Morningstar's analysis shows that ESG-rated funds outperform or match traditional funds across most categories. Their outperformance arises not from thematic bets but from structural attributes, better governance quality, lower controversy exposure, stronger risk management and more stable cash flows. These characteristics give ESG funds slight but persistent resilience in periods of market stress.

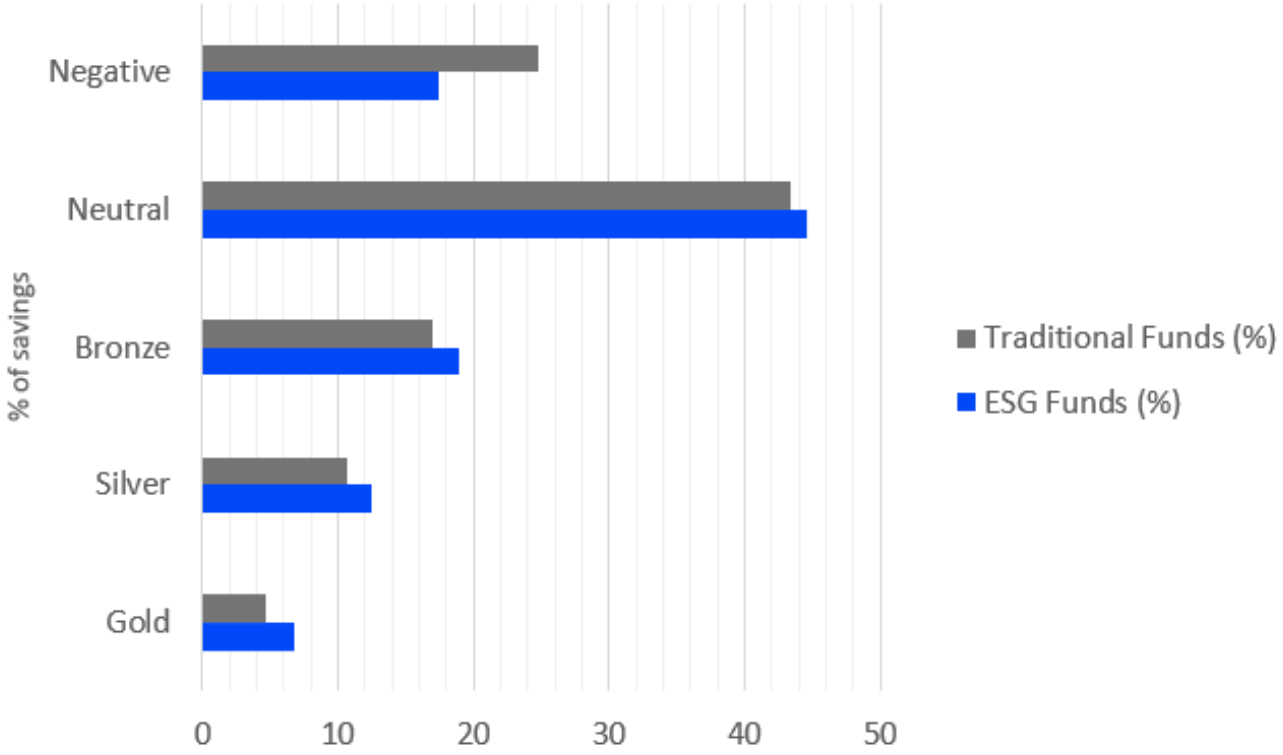


Figure 5: Comparison of Morningstar Medalist Ratings Between ESG and Traditional Investment Funds, (2024)
Source: Morningstar

Index comparisons tell the same story. The S&P 500 ESG index and the ATHEX ESG index track their parent benchmarks closely but with enhanced downside protection, a pattern observable across both the U.S. and Greek markets. In both cases, ESG indices follow similar upward trajectories to their traditional counterparts, yet they consistently demonstrate slightly higher resilience during periods of volatility.

This added stability suggests that sustainability-screened portfolios deliver smoother earnings paths and reduced idiosyncratic risk—attributes particularly valued by institutional investors with long-duration liabilities and a preference for defensive return profiles.

Figure 6: Performance Comparison Between ESG and Conventional Market Indices, (2022-2025)
Source: ATHEX, S&P Global

Turning to the sustainable debt markets, the growth of global green, social and sustainability bonds demonstrate the maturation of labelled finance as a mainstream capital-raising tool. Issuers tap these instruments not only for reputational benefit but for tangible financing advantages: deeper investor demand, potentially tighter spreads and alignment with regulatory expectations. In Europe, alignment with the EU Green Bond Standard further enhances credibility. National examples, including recent issuances in Greece, show banks and corporates using green and sustainability-linked bonds to finance grid infrastructure, renewable investments and energy-efficiency upgrades. These transactions increasingly come with KPI-based structures or Taxonomy-alignment requirements, turning each issuance into a credible transition signal.

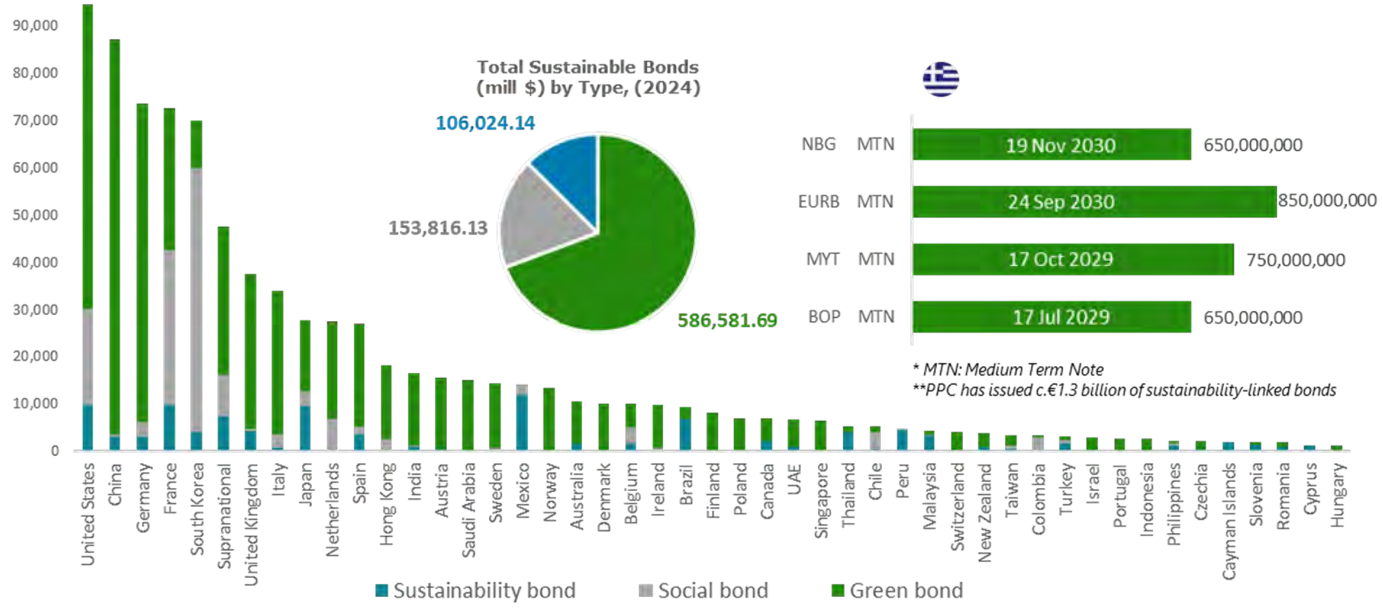


Figure 7: Global Sustainable Bonds by Country and category (mill $), (2024)
Source: Statista, efdata.org, LSEG Refinitiv, HAEE's analysis

The regional breakdown of sustainable loan activity for 2023–2024 illustrates how transition finance has become a structurally embedded component of global capital markets. Europe clearly dominates both in number of deals and total value, capturing USD 363.4 billion and nearly half of global transactions. This is not a mere artefact of market size; it reflects the regulatory compression effect created by CSRD, ESRS, EU Taxonomy and SFDR.

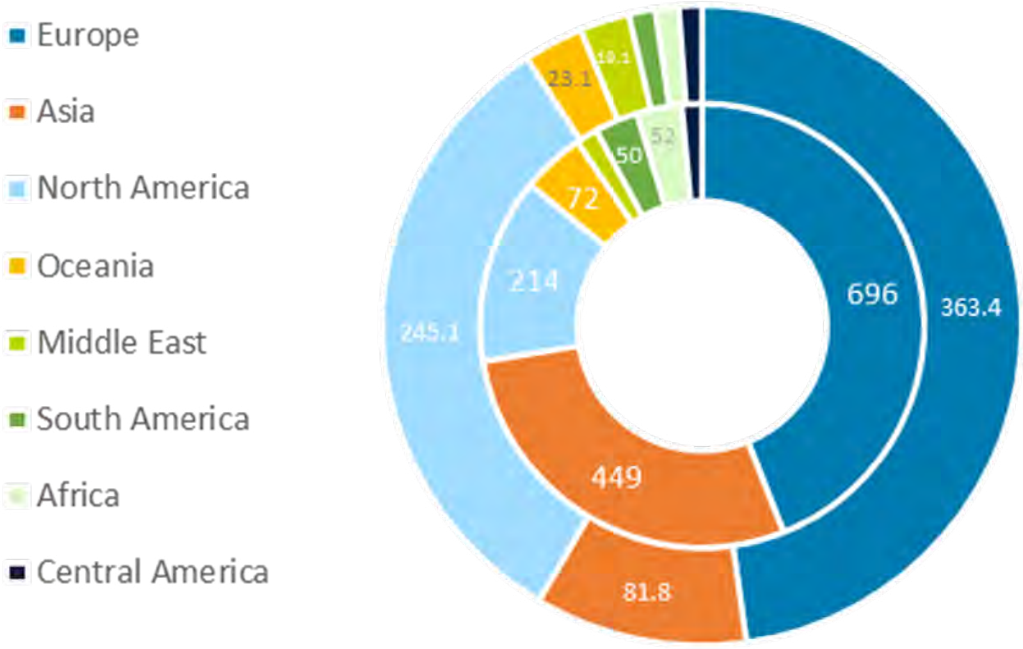


Figure 8: Number of Sustainable Loans and value of deals per Region (2023-2024)
Source: Statista, HAEE's analysis

European corporates face the most stringent sustainability disclosure requirements in the world, and European banks are subject to supervisory expectations integrating climate and environmental risks into credit assessments. As a result, sustainable loan structures, green loans, sustainability-linked loans and KPI-based credit facilities, have become the default instrument for corporate refinancing and transition investment.

Asia follows as a rapidly expanding market, characterised by a high number of transactions but smaller average deal sizes. This signals that sustainable lending is gaining traction across diverse economies, but alignment with international standards remains fragmented. North America appears comparatively under-represented, reflecting the absence of a unified sustainability reporting framework equivalent to the EU's and the greater reliance on traditional, non-labelled corporate credit.

The smaller but growing contributions from the Middle East, Latin America and Africa indicate the early stages of transition finance diffusion into emerging markets. Their participation, though modest in absolute terms, is strategically significant because it represents the integration of sustainable finance into economies where transition capital is most urgently needed.

The use-of-proceeds allocation reveals the internal logic of sustainable lending. Renewable Energy Sources (RES) account for the largest share of capital deployed, demonstrating that sustainable loans are functioning as a primary financing mechanism for the energy transition. This reflects declining technology costs for renewables, heightened geopolitical incentives for energy independence and stringent EU Taxonomy thresholds for substantial contribution to climate-mitigation objectives.

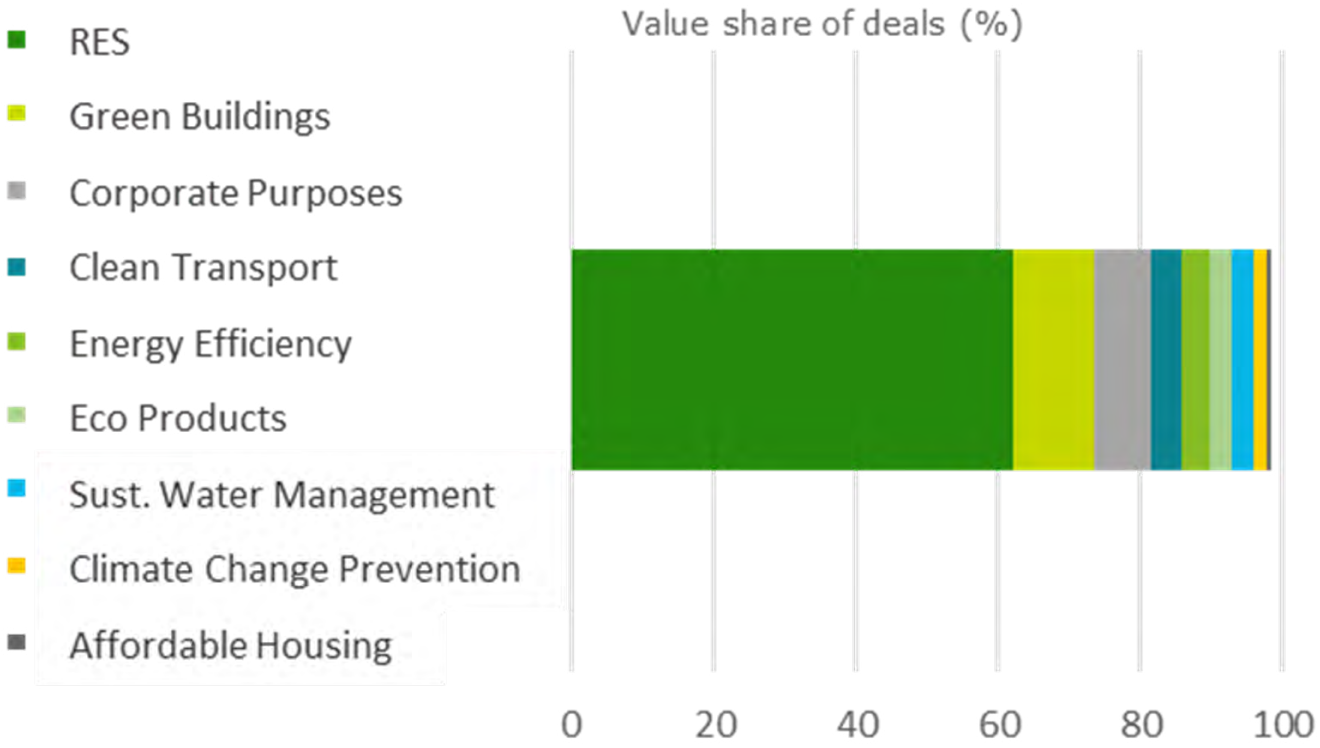


Figure 9: Use of Proceeds breakdown of Sustainable Loans (2023-2024)
Source: Statista, HAEE's analysis

Green Buildings also absorb a significant portion of capital, driven by tightening European energy-efficiency standards, climate-resilience requirements and investor pressure to mitigate stranded-asset risk in the real-estate sector. Corporate-purpose sustainability-linked loans form another major share of activity, signaling a structural shift from "project-level green finance" towards corporate-level transition financing, where interest-rate adjustments are tied to emissions reduction, energy efficiency or social KPIs.

Clean transport, sustainable water management and climate-change prevention represent smaller yet meaningful categories, in line with Taxonomy alignment criteria and broader decarbonisation objectives. Affordable housing remains under-represented, reflecting the absence of a harmonised social taxonomy and the methodological challenges of verifying social impact in lending transactions. What binds all these patterns together is the shifting strategic role of financial institutions.

Banks are no longer simple intermediaries of capital but transition gatekeepers. They must evaluate climate and environmental risk across their loan books, comply with supervisory expectations and align their portfolios with climate-neutrality trajectories. This forces them to demand high-quality ESG data from borrowers, regardless of whether those borrowers fall formally within CSRD's scope. Institutional investors perform a similar role: SFDR 2.0 obliges them to allocate capital into products with transparent sustainability characteristics, which in turn requires investee companies to provide ESRS-aligned, audit-ready data.

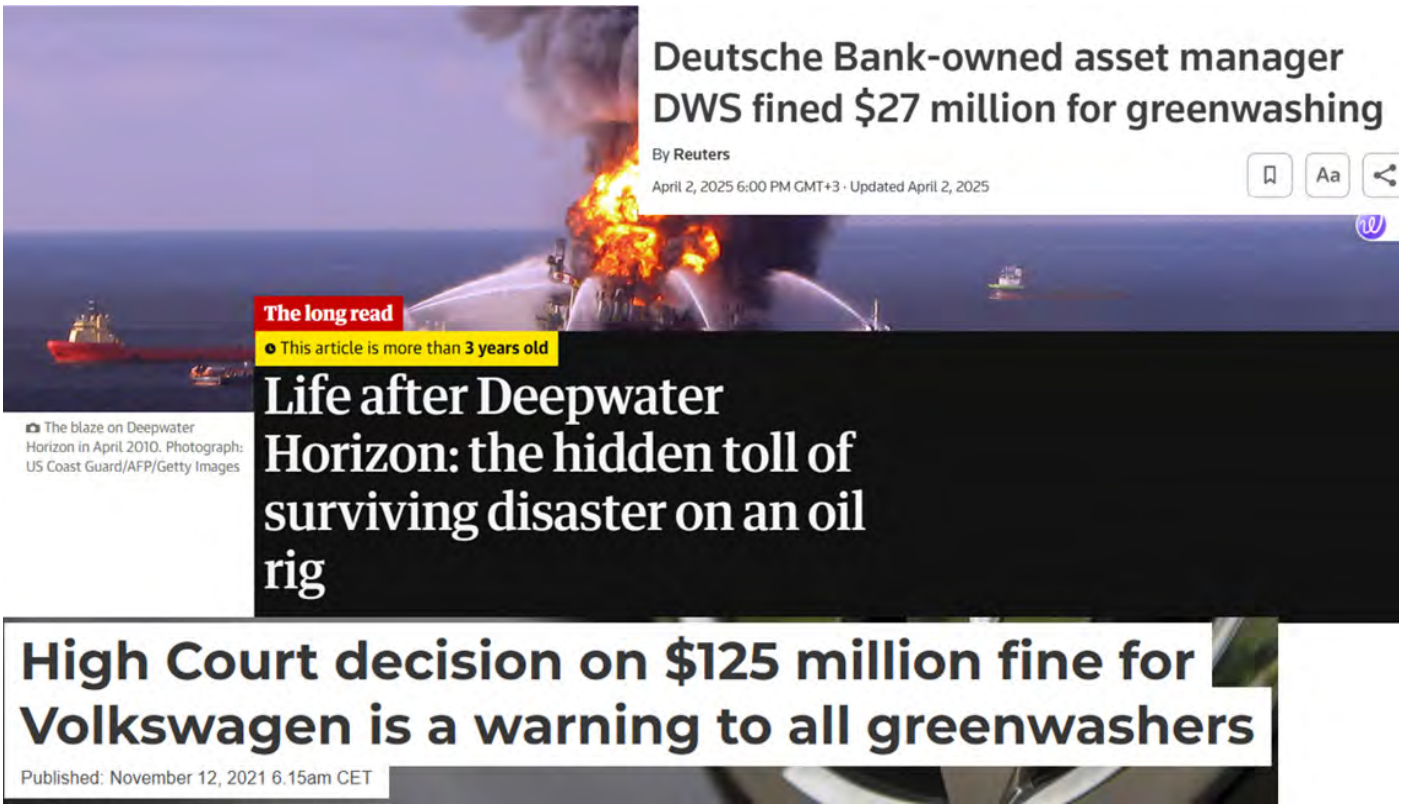
Thus, the sustainable finance system becomes a feedback mechanism. Regulatory reporting obligations generate data; data enable investor differentiation; investor preferences reward credible sustainability performance; rewarded companies gain cheaper capital; and access to cheaper capital incentivises further disclosure and decarbonisation. Where disclosure remains thin, such as real estate or parts of the global energy system, these feedback loops weaken, limiting the market's ability to channel capital into the transition. Where disclosure is robust, as in European capital markets, sustainable finance becomes not merely a policy ambition but a functioning market infrastructure.

EU Taxonomy & Greenwashing Risks

Greenwashing has become one of the defining systemic risks in contemporary sustainable finance, and its academic treatment over the past eight years underscores that the phenomenon is far more complex than mere exaggeration of environmental performance. Across recent literature, greenwashing is understood as a form of strategic information distortion that undermines the reliability of sustainability data, misallocates capital and weakens the credibility of the entire sustainable finance ecosystem (Marquis et al., 2016). Within this context, the European Union's evolving regulatory architecture, must be interpreted not simply as disclosure frameworks but as structural mechanisms designed to repair a compromised information environment.

Contemporary scholarship frames greenwashing as a problem of decoupling between symbolic sustainability communication and substantive environmentally friendly, socially ethical, and responsible governance performance. (Drempetic et al., 2020) demonstrate that firms frequently exploit measurement weaknesses and rating divergence to present inflated ESG credentials. Widyawati (2024) indicates that ESG ratings diverge substantially due to inconsistent measurement frameworks, resulting in statistical, directional and magnitude differences across ESG–financial performance models.

This divergence implies that stakeholders relying on different ESG datasets may form inconsistent or even contradictory perceptions of a firm's sustainability performance. Recent empirical studies show that capital markets penalise firms when greenwashing or ESG-related reputation risks are revealed. Xu et al. (2025) document statistically significant negative stock market reactions to 121 global greenwashing news events, while Schultz et al. (2024) find that greenwashing incidents involving banks and asset managers are associated, on average, with cumulative abnormal returns of around −0.9% over a three-day window, and even larger losses when supervisory investigations or raids are announced. Similar patterns are observed for broader ESG-reputation events, with (Nicolas et al. (2024) reporting an average abnormal return of −0.29% following ESG-risk spikes on social media.



Deutsche Bank-owned asset manager DWS fined $27 million for greenwashing

By Reuters

April 2, 2025 6:00 PM GMT+3 · Updated April 2, 2025

The long read

This article is more than 3 years old

Life after Deepwater Horizon: the hidden toll of surviving disaster on an oil rig

The blaze on Deepwater Horizon in April 2010. Photograph: US Coast Guard/AFP/Getty Images

High Court decision on $125 million fine for Volkswagen is a warning to all greenwashers

Published: November 12, 2021 6.15am CET

This diagnosis is reinforced by a series of international case studies that have become touchstones in academic analyses of sustainability misrepresentation. The Volkswagen emissions scandal revealed how technically sophisticated manipulation could be deployed to fabricate environmental performance while vehicles far exceeded legal emissions limits. Rather than a simple ethical breach, the scandal is treated in the literature as evidence of how data manipulation exploits informational asymmetry in environmental assessment regimes. Similarly, BP's "Beyond Petroleum" narrative, juxtaposed with the Deepwater Horizon catastrophe, illustrates the capacity of symbolic environmental branding to obscure structural safety failures, as an example of "high-level symbolic decoupling" with severe ecological and social consequences. More recently, investigations into DWS's overstated ESG processes illustrate greenwashing within financial products themselves, revealing that sustainability misrepresentation extends across the entire investment chain, not only to operating companies. Deutsche Bank's investment arm DWS has been fined €25 million (USD$27 million) over charges that it misled investors over its sustainable investing credentials. These cases collectively demonstrate that greenwashing operates at operational, organisational and systemic levels, shaping regulatory learning curves across jurisdictions.

It is against this empirical and theoretical backdrop that the EU Taxonomy has emerged as a foundational instrument against greenwashing. By imposing scientifically grounded, legally enforceable technical screening criteria, the Taxonomy transforms sustainability classification from a narrative exercise into a measurable, auditable construct. Recent academic work emphasises that such standardisation reduces information asymmetry and ensures that sustainability claims rest on verifiable environmental thresholds rather than interpretive flexibility. The Taxonomy's binary logic-aligned or not aligned, deliberately restricts the elasticity of environmental claims, particularly in sectors where firms have historically used vague language to signal commitment without substantive change. In doing so, it shifts sustainable finance from a regime of "claims-based trust" to one of "evidence-based trust".

Yet classification alone cannot eliminate greenwashing. The credibility of sustainability information depends on the robustness of verification mechanisms. CSRD's introduction of external assurance, marks a structural shift in how sustainability information is governed. Assurance brings sustainability data under an accountability regime comparable to that of financial reporting, requiring firms to demonstrate internal controls, methodological consistency, documentation trails and traceability of source data. Market participants are already responding: investors increasingly rely on assured sustainability reports as signals of data reliability, and companies recognise that inconsistent or unverifiable disclosures carry growing legal and financial risks. Research in accounting and sustainability reporting argues that external assurance can strengthen the credibility and decision-usefulness of sustainability disclosures by limiting managerial discretion and reducing information risk. Christensen et al. (2021) emphasise that assurance has the potential to curb selective disclosure and enhance the reliability of sustainability information, supporting the EU's rationale for treating sustainability data as increasingly aligned with financially material information.

As regulation tightens, the literature stresses that greenwashing is fragmenting into more specific forms. In climate finance, "transition-washing" describes situations where claims or omissions create the impression that an entity is transitioning to net zero "to a greater extent or more rapidly than it actually is" (ClientEarth, 2024) and where misrepresentation of strategies, trajectories or targets undermines the credibility of transition finance (Kim et al., 2024). In sustainable and impact investing, international standard-setters refer to "impact washing" as unfounded or unsubstantiated claims about positive social or environmental impact, i.e. investors or issuers who "claim to align with […] development objectives without providing meaningful supporting evidence" (OECD-UNDP, 2021). A further emerging concern is "data washing", defined as the "selective release of data that portrays a favorable image without providing the depth required for rigorous evaluation" or the superficial use of sustainability data to project a positive image without genuine commitment to ethical practices and increasingly grouped by practitioners alongside greenwashing and other forms of ESG-related misrepresentation. The EU's regulatory measures, Taxonomy alignment, mandatory ESRS reporting, SFDR 2.0 thresholds, and auditor oversight, are therefore best understood as components of a single anti-greenwashing architecture intended to close these loopholes.

BIBLIOGRAPHY

Christensen, H. B., Hail, L., & Leuz, C. (2021). Mandatory CSR and sustainability reporting: economic analysis and literature review. Review of Accounting Studies, 26(3), 1176–1248. https://doi.org/10.1007/s11142-021-09609-5

Drempetic, S., Klein, C., & Zwergel, B. (2020). The Influence of Firm Size on the ESG Score: Corporate Sustainability Ratings Under Review. Journal of Business Ethics, 167(2), 333–360. https://doi.org/10.1007/s10551-019-04164-1

Kim, S., Li, T., & Wu, Y. (2024). Corporate Carbon Offsets: Decarbonization or Transition-Washing?

Marquis, C., Toffel, M. W., & Zhou, Y. (2016). Scrutiny, norms, and selective disclosure: A global study of greenwashing. Organization Science, 27(2), 483–504. https://doi.org/10.1287/orsc.2015.1039

Nicolas, M. L. D., Desroziers, A., Caccioli, F., & Aste, T. (2024). ESG reputation risk matters: An event study based on social media data. Finance Research Letters, 59. https://doi.org/10.1016/j.frl.2023.104712

OECD-UNDP. (2021). Impact Standards for Financing Sustainable Development (Best Practices in Development Co-Operation). https://doi.org/10.1787/744f982e-en

Schultz, M. D., Clegg, M., Hofstetter, R., & Seele, P. (2024). Algorithms and dehumanization: a definition and avoidance model. AI and Society, 40(4), 2191–2211. https://doi.org/10.1007/s00146-024-02123-7

Widyawati, L. (2024). Understanding the ESG and Financial Performance Relationship: Different Metrics Matters. Perspektif Akuntansi, 7(3), 298–314. https://doi.org/10.24246/persi.v7i3.p298-314

Xu, M., Tse, Y. K., Geng, R., Liu, Z., & Potter, A. (2025). Greenwashing and market value of firms: An empirical study. International Journal of Production Economics, 284. https://doi.org/10.1016/j.ijpe.2025.109606

HAEE

HELLENIC ASSOCIATION
for ENERGY ECONOMICS

Strategic Energy Shifts:
Policies and Politics in Transition

11th HAEE ENERGY TRANSITION SYMPOSIUM

26-28 MAY 2026

MAROUSSI PLAZA CENTRE I ATHENS

Thalia Valkouma

faria renewables

Sotiris Batzias

50 YEARS IN GREECE | Deloitte.

The Compliance Challenge

Thalia Valkouma

President & CEO,
Faria Renewables

Compliance Challenge for Companies

As the European Union accelerates its agenda for corporate transparency and sustainability, companies across Europe are confronting a dense regulatory tapestry: a network that combines legislation, delegated acts, technical standards, evolving data requirements and shifting policy priorities. For many, navigating this "ESG ecosystem" has become not only a compliance task but a major operational and strategic challenge.

In the rapidly scaling field of the renewable energy sector, the challenge is even more pronounced: integrating these frameworks is essential not only for compliance, but also for competitiveness, credibility, and long-term value creation. At FARIA Renewables, although we are not yet legally required to report under the new rules, we made an early and deliberate decision to align voluntarily. This early alignment strengthens our internal capabilities, supports more robust governance structures, and ensures that we are fully prepared for the regulatory landscape ahead.

When Compliance Meets Complexity

Behind acronyms such as CSRD, ESRS, SFDR, and the EU Taxonomy lies a deeply interconnected regulatory ecosystem. The Corporate Sustainability Reporting Directive, adopted in 2022, together with the European Sustainability Reporting Standards introduced in 2023, forms the backbone of this new framework by defining how companies must disclose sustainability performance with unprecedented granularity. Yet none of these requirements can be understood in isolation. They operate in constant interaction with the EU Taxonomy and the Sustainable Finance Disclosure Regulation, creating a political and regulatory puzzle that companies must decipher with precision.

For the renewable energy sector - positioned at the center of Europe's climate and energy transition - this puzzle is uniquely demanding. Operators manage long development cycles, intricate permitting processes, sensitive interactions with local ecosystems, and increasingly global supply chains. Sustainability reporting, therefore, is not an administrative add-on; it is embedded in everyday operations, project design, and long-term strategy.

Understanding how these regulations interconnect is essential. Early CSRD-preparation efforts have shown that both ESG teams and senior leadership often struggle to "see the system as a whole", especially when different frameworks demand overlapping, but not identical, disclosures. This challenge is compounded by the uneven availability and quality of ESG data across markets. Even core indicators, such as Scope 1, 2, and 3 emissions, are often unavailable or measured inconsistently across suppliers and regions. Without reliable data foundations, companies must invest early in systems, processes, and governance mechanisms to ensure accuracy and auditability. Such investments require notable financial and organizational commitment—especially for rapidly expanding renewable developers, IPPs, and investors. Meanwhile, the risk of "reporting fatigue" is growing. Companies striving to comply simultaneously with CSRD, the EU Taxonomy, and SFDR often find themselves navigating a maze of methodologies rather than communicating meaningful sustainability progress. Policymakers have acknowledged this challenge, prompting ongoing "Omnibus" revisions aimed at reducing complexity and increasing proportionality. Yet for companies, the reality continues to be one of constant adaptation.

Why FARIA Renewables Chose to Act Early

Despite not yet being legally required to comply with CSRD, FARIA Renewables made a strategic decision: to move forward with voluntary early alignment. This engagement is not merely a compliance exercise - it is a long-term investment in transparency, operational resilience, and internal maturity.

This decision reflects both our strategic philosophy and the identity of our organization. As a joint corporate formation between the FARIA Group and the Capenergie 5 Fund, FARIA Renewables is at the forefront of the sustainability transition, combining a profound international know-how and a grounded local presence in Greece. Even in the absence of immediate legislative obligation, we recognize that true leadership in renewable energy requires moving decisively before compliance becomes mandatory. Therefore, for us, proactive engagement with the EU's sustainable-finance architecture is not optional; it is a strategic catalyst enabling long-term readiness and resilience.

As the regulatory landscape continues to evolve, the companies that embrace transparency today will be the ones shaping the energy markets of tomorrow—and contributing decisively to a greener, more resilient Europe.

The flexibility revolution shaping the energy future

Sotiris Batzias

Partner, Strategy & Business Design, Deloitte Greece

The energy transition represents one of the most profound and complex transformations of the 21st century. The rapid integration of renewable energy sources, the shift towards decentralized generation systems and the surging demand driven by the digitalization of our economy are collectively reshaping the energy landscape. In this evolving context, the inherent variability between supply and demand necessitates a balanced, reliable, cost-competitive and economically sustainable energy system.

Meeting such diversified and critical electrification needs across the economy requires an increasingly responsive ecosystem and an enabling architecture capable of effectively managing supply and demand fluctuations. Solutions such as energy storage, demand response, smart meters, sensors and distributed energy resource (DER) management platforms can provide the technical backbone that enables the grid to adapt to variable production. These innovations reduce dependence on peak generation units and mitigate the need for extensive grid expansions. Prioritizing flexibility assets enables the energy system to better manage fluctuations, reduce reliance on costly peak generation and rationalize grid expansions.

Key participants in the flexibility market include energy producers and consumers, flexibility service providers (aggregators), system operators, regulators and technology vendors. Various collaboration models exist, such as direct participation by consumers and producers, aggregator models that pool smaller resources and open-access platforms. Distribution system operators (DSOs) are central to this transformation, tasked with modernizing the architecture of low- and medium-voltage networks. Examples from advanced markets, such as the UK Power Networks' flexibility programme, demonstrate that flexibility-enhancing technologies and related solutions can deliver high returns with tangible operational and economic benefits, from alleviating grid congestion, deferring costly infrastructure investments and bolstering system reliability.

Meanwhile, energy transition has driven Europe's efforts during the last years, where it has made remarkable progress, reducing emissions by 30% since 2005—more than any other major economy. Yet geopolitical tensions and the evolving energy system architecture have driven electricity prices higher, underscoring the urgent need for economically viable solutions and financing tools that support a stable, competitive and resilient transition. With rising prices, regulators may challenge the economic viability of proposed grid expansions and effectively minimize the impact of increased costs on consumers and businesses.

Flexibility solutions can help reduce the overall risk profile of existing energy portfolios, by enhancing grid reliability and lowering exposure to market volatility. On this basis, promoting flexibility seems like a sensible choice to improve the economic viability of existing investments across the energy value chain. It, also, presents a compelling opportunity to unlock new revenue streams for those that can effectively manage flexibility, also support the development of resilient DER management capabilities, including workforce training and development. This approach will help unlock the potential for utilities and the downstream economy to implement their plans. Moreover, it will rationalize future investments by better addressing the increasingly complex challenges of the energy transition.

Last, promoting flexibility is a strategic choice that strengthens the stability and resilience of the energy system, while becoming instrumental to competitiveness within an energy-intensive growth agenda. Enhanced collaboration among stakeholders, active adaptation in addressing the supply and demand equilibrium, as well as the judicious deployment of financial instruments will determine the leaders of tomorrow's energy future.


2050

inFOCUS

ISSUE #08 / JANUARY 2026

Behind the Abbreviations: Decoding the EU Sustainable Finance Framework – from ESG to CSRD, SFDR, ESRS, and the Omnibus Puzzle

A PUBLICATION OF:

HAEE
HELLENIC ASSOCIATION
for ENERGY ECONOMICS