ISSN: 3033-4136

DOI https://doi.org/10.17868/strath.00092210

The EU Green Deal and the Sustainable Finance Framework

FRIL
Financial Regulation Innovation Lab

FinTech Scotland

University of Glasgow

University of Strathclyde Glasgow

Financial Regulation Innovation Lab

Who are we?

The Financial Regulation Innovation Lab (FRIL) is an industry-led collaborative research and innovation programme focused on leveraging new technologies to respond to, shape, and help evolve the future regulatory landscape in the UK and globally, helping to create new employment and business opportunities, and enabling the future talent.

FRIL provides an environment for participants to engage and collaborate on the dynamic demands of financial regulation, explore, test and experiment with new technologies, build confidence in solutions and demonstrate their ability to meet regulatory standards worldwide.

What is Actionable Research?

FRIL will integrate academic research with an industry relevant agenda, focused on enabling knowledge on cutting-edge topics such as generative and explainable AI, advanced analytics, advanced computing, and earth-intelligent data as applied to financial regulation. The approach fosters cross sector learning to produce a series of papers, actionable recommendations and strategic plans that can be tested in the innovation environment, in collaboration across industry and regulators.

Locally-led Innovation Accelerators delivered in partnership with DSIT, Innovate UK and City Regions

Department for Science, Innovation & Technology

UKRI

Innovate UK

GLASGOW CITY REGION

FRIL White Paper Series

The EU Green Deal and the Sustainable Finance Framework

Steven Owens*

** University of Strathclyde*

February 2025

Abstract: This white paper is the first in a set exploring the use of geospatial data in Environmental, Social and Governance (ESG) regulations. This first paper introduces the EU's Green Deal and Sustainable Finance Framework to set the scene for exploring the European Sustainability Reporting Standards (ESRS) in detail. The ESRS are a focal point as they are the most substantial and, importantly, first mandatory sustainability standards that demand a *double materiality* approach. This requires a joint assessment of the impact the corporation is having on the environment and society, and the financial risks and opportunities that sustainability factors are having on the corporation. Simply put, if you adhere to the ESRS, then you are likely to satisfy other sustainability standards or frameworks.

The ESRS are a foundational element of the Corporate Sustainability Responsibility Directive (CSRD), the Sustainable Finance Reporting Directive (SFDR) and the Corporate Sustainability Due Diligence Directive (CSDDD), which together contribute to the EU's Sustainable Finance Framework. These are mandatory directives within the EU and present the first opportunity to assess corporations on a level playing field using double materiality. The aim of this set of white papers is to present the reader with information to:

a. Understand the EU sustainability landscape, and its place within the international sustainability landscape;

b. Demonstrate the link between corporate reporting and sustainable finance, by discussing the relationship between the CSRD, SFDR and CSDDD;

c. Identify the opportunities within Financial Services due to the introduction of mandatory standards using double materiality, specifically the ESRS;

d. Demonstrate how geospatial data can be used to aid the disclosure requirements of the ESRS.

TABLE OF CONTENTS

1. Introduction

The European Union is undertaking a comprehensive transformation of its economy and society to align with sustainability and climate neutrality goals. At the heart of this effort is the EU Green Deal, a strategy that spans multiple sectors and policies, with 2050 as the target date for achieving climate neutrality. This shift comes amid alarming global trends, such as a nearly 40% decline in global natural capital per person since the early 1990s (Hallmann et. al., 2017). As humanity increasingly realises that its economic well-being is intrinsically tied to healthy ecosystems, biodiversity, and the services nature provides, the spotlight is on shifting finance flows away from harmful practices and toward regenerative, sustainable activities.

For the Financial Services (FS) sector, evolving standards and frameworks create both responsibilities and new market opportunities. The capacity of *nature*—defined here as the natural world, emphasising the diversity of living organisms and their interactions (The Taskforce on Nature-Related Financial Disclosures, 2023)—to support economic activities is no longer seen as infinite or without cost. Recognising that over half of global GDP depends on nature's services (WWF, 2024), the EU's sustainability frameworks seek to realign market incentives and bring long-neglected ecological considerations into mainstream financial decision-making.

2. The EU Green Deal: A New Paradigm for Sustainability

The EU Green Deal lays out a comprehensive strategy to address climate change, protect biodiversity, and ensure sustainable resource use (European Commission, 2024a). By setting intermediate targets for 2030, set out in the EU Environment a) (European Parliament, 2022a), the EU aims to catalyse rapid changes in how businesses operate and how investors allocate capital.

For Financial Services, the importance of these environmental targets cannot be overstated. As companies begin to align their operations with the EU Green Deal objectives, investors and financial institutions gain a more reliable foundation for evaluating long-term sustainability risks and opportunities. By understanding how corporate activities comply with these broad environmental strategies, financial actors can better allocate capital, develop new sustainability-focused products, and drive innovation that meets the evolving expectations of clients, regulators, and society at large.

2.1 Sustainable Finance: A Framework for Driving Capital Toward Sustainability

To support the transition to a sustainable economy, the EU has developed the Sustainable Finance Framework. This framework aims to redirect capital flows towards sustainable investments and manage financial risks associated with environmental and social issues. At its core is the principle that transparent, standardised data on sustainability performance enables more informed decision-making, both for companies and the Financial Services sector.

One of the critical tools within this framework is the EU Taxonomy (European Parliament, 2020), a classification system that defines what qualifies as environmentally sustainable economic activity. It focuses on six environmental objectives

1. climate change mitigation,

2. climate change adaptation,

3. sustainable use and protection of water and marine resources,

4. transition to a circular economy,

5. pollution prevention and control, and

6. protection and restoration of biodiversity and ecosystems.

For an activity to be considered Taxonomy-aligned, it must contribute substantially to at least one objective without significantly harming the others, a concept known as Do No Significant Harm (DNSH). It must be carried out in compliance with minimum safeguards and comply with technical screening criteria.

The EU Taxonomy aims to provide a common language, ensuring consistency and comparability across sectors and geographies. For Financial Services firms—ranging from asset managers to lenders—this clarity should help identify which investments genuinely support sustainability goals. By guiding capital towards Taxonomy-aligned activities, the Financial Services sector should play a pivotal role in accelerating the EU's environmental transition, by improving portfolio resilience and strengthening market confidence in sustainable finance products.

2.2 Key Directives in the Sustainable Finance Framework

This framework encompasses several key directives and regulations aimed at promoting transparency, accountability, and sustainable practices across various sectors of the economy. The following overview outlines the main components of this framework and their interconnected roles in shaping a more sustainable economic landscape.

Corporate Sustainability Reporting Directive (CSRD) (European Parliament, 2022b): This directive expands on the Non-Financial Reporting Directive (NFRD) to enhance sustainability reporting requirements for companies. It provides more comprehensive and standardised disclosure of environmental, social, and governance (ESG) information. It integrates the European Sustainability Reporting Standards (ESRS) to ensure companies report on both how sustainability issues affect their organisation financially (financial materiality) and how their organisation impacts the environment and society (impact materiality), an approach known as double materiality.

Sustainable Finance Disclosure Regulation (SFDR) (European Parliament, 2019): The SFDR aims to improve transparency in the financial sector regarding sustainability risks and impacts. It requires financial market participants to disclose how they integrate ESG factors into their investment decisions and products. Importantly, it is informed by ESRS disclosures requirements from the CSRD.

The SFDR requires specific transparency for two types of financial products: those promoting environmental or social characteristics (Article 8), also known as light green products, and those with sustainable investment as their objective (Article 9), also known as dark green products.

2.3 Three Tests for Sustainable Investments

To assess whether an investment is sustainable or not, the SFDR defines three tests (ESMA, 2023):

1. **Positive Environmental or Social Contribution:** The investment must contribute to an environmental or social objective. This can include sustainable activities by nature (e.g., renewable energy), impact on biodiversity or tackling inequality.

2. **Good Governance:** The investee company must follow good governance practices. This includes sound management structures, employee relations, remuneration of staff, and tax compliance.

3. **Do No Significant Harm (DNSH):** The investment must not significantly harm any environmental or social objective. This involves

assessing Principal Adverse Impacts (PAIs) and ensuring adherence to international guidelines such as the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises and the UN Guiding Principles on Business and Human Rights.

These three tests collectively ensure that investments labelled as "sustainable" under SFDR not only contribute positively to environmental or social objectives but also maintain high standards of governance and avoid inadvertently causing significant harm to other sustainability goals.

Corporate Sustainability Due Diligence Directive (CSDDD) (European Parliament, 2024a): This directive establishes obligations for companies to identify, prevent, mitigate, and account for adverse human rights and environmental impacts in their operations and value chains.

In addition to the above directives, the EU also have regulations focussed on green bonds (European Parliament, 2023) and ESG ratings (European Parliament, 2024b) that contribute to the Sustainable Finance Framework. ESG ratings play a crucial role in this ecosystem by providing investors and stakeholders with assessments of companies' environmental, social, and governance performance. These ratings are increasingly important in guiding investment decisions and evaluating corporate sustainability efforts. The CSRD, SFDR, and CSDDD aim to collectively enhance the quality and availability of sustainability data, which in turn improves the accuracy and reliability of ESG ratings.

2.4 Interoperability and a Cohesive Framework

The interoperability of CSRD, SFDR, and CSDDD create a comprehensive framework that ensures sustainability disclosures become more accurate, actionable, and comparable. Financial Services firms can access location-based datapoints, environmental risk indicators, and metrics that go beyond simplistic annual reports. Over time, these richer datasets will reduce uncertainty, enable aggregated analyses, and encourage meaningful stakeholder engagement to mitigate environmental and societal harm. Figure 1 lays out the relationship between the directives, and the flow of data through the framework.

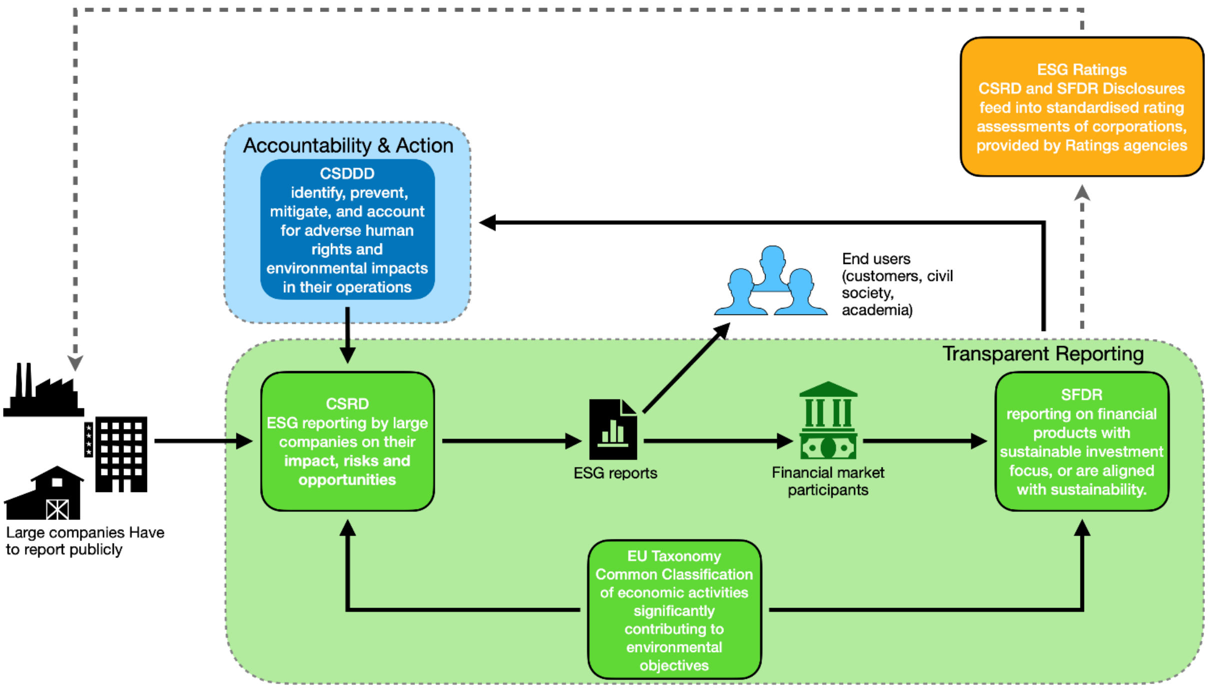

Figure 1: The role of the EU Taxonomy, and the link between the CSRD, SFDR, CSDDD AND ESG Ratings

3. The EU OMNIBUS (As of February 2025)

European Commission President Ursula von der Leyen has recently announced plans for a "simplification revolution" - a comprehensive initiative to streamline regulatory frameworks across Europe (European Commission, 2025). At its core, this reform aims to ease the administrative burden on businesses, with special consideration for Small and Medium-sized Enterprises (SMEs). The Commission has set a target to reduce reporting requirements by at least 25% in the first half of 2025, while also introducing mandatory competitiveness assessments and red-tape evaluations for future regulatory proposals.

Expected to be formally announced in late February 2025, this initiative is likely to have significant implications for key sustainability regulations, including the CSRD, CSDDD, and EU Taxonomy Regulations. While the exact scope and scale of these changes remains to be determined, the Financial Regulation Innovation Lab (FRIL) will provide detailed analysis once the official announcement is made.

4. Integration into the wider Regulation and Framework Ecosystem

The regulation landscape is complex, and depending on where you operate in the world, different regulations and standards apply. Until now, companies have adopted certain sustainability standards on a voluntary basis and reported them most often in their annual reports with varying degrees of consistency, in line with a single, or multiple, reporting frameworks. Figure 2 highlights the evolution of ESG disclosures from 1996 to 2026. It highlights the vast number of frameworks and regulations that are available. Notably, there has been a significant increase in the number of frameworks/regulations over the last five-year period as sustainability expectation grow.

Figure 2: The evolution of Sustainability Disclosure Standards and Frameworks (source: IFC) (IFC, 2023)

In 2023 the International Finance Corporation (IFC) created a comparison table (IFC, 2023) comparing different standards and frameworks, which was useful to easily identify the different materiality types, the focus of the regulation / framework and its geographical coverage. The table compared the ESRS - the core component of the CSRD - to prominent regulations and frameworks. In Table 1, we have extended this to include the TNFD, which is currently a voluntary framework, and accommodates both double materiality and financial materiality only. However, the International Sustainability Standards Board (ISSB) is currently investigating disclosure related to risks and opportunities associated with nature and human capital, which includes relevant aspects of the TNFD (IFRS, 2024) Like the Taskforce on Climate-Related Financial Disclosures (TCFD), the TNFD could therefore be merged into the ISSB at a future date. This comparison table is relevant as the International Federation of Accountants reports that over 80% of companies report against multiple standards/frameworks, and therefore it is useful to minimise effort by mapping similarities and relevant disclosures (IFAC, 2024). The table highlights the main components of each framework / regulation, such as its type, application geographical coverage and the topics that it covers. The materiality expectations, as well as definitions are also provided.

Framework/ Standard	GRI	ESRS	TNFD	ISSB	Consolidated into ISSB		
					Integrated Reporting Framework	SASB Standards	TCFD
Type of Guidance	Standards	Standards	Guidelines	Standards	Framework	Standards	Guidelines
Application	Voluntary	Mandatory for large companies and listed SMEs	Voluntary	Subject to national jurisdiction adoption	Voluntary	Voluntary	Voluntary
Coverage	Global	European Union (third countries in future)	Global	Global	Global	U.S., to be applicable globally	Global
Topics	Economic, environmental, and social activities and impacts	Environmental, social, and governance	Nature-related risks and opportunities, biodiversity impacts, ecosystem dependencies	General Sustainability; Climate; Other topics to be added	Six capitals: financial, manufactured, intellectual, human, social, natural	Environment, social capital, human capital, business model & innovation, leadership & governance	Climate-related risks, opportunities, financial impacts, and scenario analysis
Sector Specific	No	Yes (forthcoming)	Yes	Yes	No	Yes	Yes
Target Audience	All stakeholders	All stakeholders	Investors	Investors	Providers of financial capital	Investors	Investors
Building Blocks		TCFD, GRI, CDP	TCFD, GRI, CDP	TCFD, SASB, CDSB			

Materiality Type	Impact materiality	Double-materiality (financial + impact materiality)	Double-materiality (financial + impact materiality)	Single materiality (financial materiality)	Single materiality (financial materiality)	Single materiality (financial materiality)	Single materiality (financial materiality)
Materiality Definition	Aspects that reflect the organisation's significant economic, environmental, and social impacts; or that substantively influence the assessments and decisions of stakeholders.	Impact on people or the environment and financial effects on undertaking over the short-, medium- and long-term time horizons.	Impact on ecosystems and biodiversity, and the financial implications of nature-related risks and dependencies across the short-, medium-, and long-term time horizons.	Information is material if omitting, misstating, or obscuring that information could reasonably be expected to influence decisions that the primary users of general-purpose financial reporting.	Matter that could substantively affect the organisation's ability to create value in the short, medium, or long term.	A fact is material if there is a substantial likelihood that a reasonable investor would view its omission or misstatement as having significantly altered the total mix of information.	Public companies' legal obligation to disclose information in their financial filings—including material climate-related information.

Table 1: Comparison of Sustainability Disclosure Standards and Frameworks, with addition of TNFD (IFC, 2023)

The table highlights that the ESRS was built upon the TCFD, GRI and CDP. This is a result of it being built to complement existing standards and frameworks to minimise the reporting burden that corporations face. For reader convenience, Table 2 provides links to the relevant mappings the ESRS has published. Note that the ISSB has consolidated the TCFD into its standards.

Regulation / Framework	**Mapping information**
ISSB	https://www.efrag.org/sites/default/files/sites/webpublishing/SiteAssets/ESRS-ISSB Standards Interoperability Guidance.pdf

GRI	https://www.efrag.org/system/files/sites/webpublishing/Meeting Documents/2305101050307353/04-02 draft ESRS-GRI Interoperability Index SR TEG meeting 5 December.pdf
TNFD	https://www.efrag.org/sites/default/files/sites/webpublishing/SiteAssets/TNFD ESRS Correspondence mapping Final.pdf

Table 2: Interoperability of the ESRS with international regulations and frameworks (2024)

5. Shaping Market Behaviour and Unlocking New Opportunities

As Financial Services integrate these frameworks into their operations, they open new avenues for product development, such as sustainability-linked bonds, green mortgages, and climate-resilient insurance products. Moreover, machine-readable and comparable sustainability data, required by the CSRD, should streamline portfolio analysis, enable automation in ESG assessments, and reduce operational costs. Investors gain enhanced visibility into corporate sustainability performance, facilitating fact-based engagement, more strategic capital allocation, and improved risk-return profiles over the long term. The requirement for machine-readable sustainability data, providing a standardised format, coupled with mandatory double materiality assessments presents interesting opportunities related to technical innovation. At FRIL, we are actively exploring the use of geospatial data, particularly earth observation data from satellites and generative AI in this area. Combined, these technologies could increase transparency, improve assurance rates and reduce the administrative burden associated with disclosures.

6. Conclusion

The EU Green Deal and its Sustainable Finance Framework establish a groundbreaking standard for sustainability reporting through double materiality requirements. This approach examines both environmental and social impacts alongside financial implications for businesses. While these enhanced disclosure requirements improve transparency, they also present data collection challenges that extend beyond internal company information. Emerging technologies—particularly generative AI and earth observation data—are positioned to become essential tools in facilitating these complex disclosures.

This white paper serves as an introduction to the EU's Sustainable Finance Framework. Subsequent papers will examine the European Sustainability Reporting Standards in detail, focusing on double materiality disclosure requirements and identifying key geospatial data sources that can support both disclosure preparation and assurance processes.

References

ESMA, 2023. Note on DNSH definitions and criteria across the EU Sustainable Finance framework. European Securities and Markets Authority Technical Report ESMA30-379-2281.

European Commission, 2024a. The European Green Deal [WWW Document]. URL https://environment.ec.europa.eu/strategy_en (accessed 02.12.25).

European Parliament, 2019. Regulation (EU) 2019/2088 on sustainability-related disclosures in the financial services sector. Official Journal of the European Union L 317, 1-16.

European Parliament, 2020. Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment. Official Journal of the European Union L 198, 13-43.

European Parliament, 2022a. Decision (EU) 2022/591 on a General Union Environment Action Programme to 2030. Official Journal of the European Union L 114, 22-36.

European Parliament, 2022b. Directive (EU) 2022/2464 on Corporate Sustainability Reporting. Official Journal of the European Union L 322, 15-80.

European Parliament, 2023. Regulation (EU) 2023/2631 on European green bonds. Official Journal of the European Union L 305, 1-44.

European Parliament, 2024a. Directive (EU) 2024/1760 on Corporate Sustainability Due Diligence. Official Journal of the European Union L 36, 1-56.

European Parliament, 2024b. Regulation (EU) 2024/3005 on ESG ratings. Official Journal of the European Union L 19, 1-71.

European Commission, 2025. A Simpler and Faster Europe: Communication on Implementation and Simplification [WWW Document]. European Commission. URL https://commission.europa.eu/document/download/8556fc33-48a3-4a96-94e8-8ecacef1ea18_en?filename=250201_Simplification_Communication_en.pdf (accessed 2.12.25)

Hafner, M., Raimondi, P.P., 2020. Priorities and challenges of the EU energy transition: From the European Green Package to the new Green Deal. Russian Journal of Economics 6, 374-389.

Hallmann, C.A., Sorg, M., Jongejans, E., Siepel, H., Hofland, N., et al., 2017. More than 75 percent decline over 27 years in total flying insect biomass in protected areas. PLOS ONE 12:e0185809.

IFC, 2023. Understanding Global Reporting Frameworks [WWW Document]. International Finance Corporation. URL https://www.ifcbeyondthebalancesheet.org/understanding-global-reporting-frameworks (accessed 02.12.25).

IFRS, 2024. ISSB commence research projects on risks and opportunities associated with nature and human capital [WWW Document]. URL https://www.ifrs.org/news-and-events/news/2024/04/issb-commence-research-projects-risks-opportunities-nature-human-capital/ (accessed 02.12.25).

TNFD, 2023. Guidance on the identification and assessment of nature-related issues: The LEAP approach, v1.1. Taskforce for Nature-Related Financial Disclosures Technical Report.

WWF, 2024. Living Planet Report 2024 – A System in Peril. WWF, Gland, Switzerland.

About the Author

Dr Steven Owens is a member of the Financial Regulation Innovation Lab and the Applied Space Technology Lab at the University of Strathclyde. His work combines geospatial data and AI to address real-world challenges in environmental compliance and sustainability. He has a particular focus on Environmental, Social and Governance (ESG) regulations and frameworks such as the EU Regulation on Deforestation (EUDR), the Corporate Sustainability Reporting Directive (CSRD) and The Taskforce on Nature-Related Financial Disclosures (TNFD). With focus on the social aspect of ESG regulations, he has recently led efforts to analyse the impact of deforestation on indigenous communities in the Brazilian Amazon due to mineral extraction. Prior to joining Strathclyde, Steve held a leadership role at a geospatial technology firm helping Financial Services integrate geospatial data into their daily operations. He holds a PhD in space technology and has been working alongside industry partners to gain insights from data for over a decade.

Get in touch

FRIL@FinTechscotland.com