



Master's Degree in Strategic Management

Chair of International Project Finance and Sustainability

From Compliance to Strategy:
The Role of Double Materiality in Shaping
Corporate Sustainability - Analysis of the energy
and utilities sector

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Executive Summary

Rationale

Pollution, climate change, and sustainability are among the most frequently heard words in recent decades, often confused or used interchangeably. Now, due to conferences and other global events, these terms are gradually becoming part of the daily lives of citizens, companies, and nations. It is now clear that businesses can no longer ignore the impact they have on the surrounding environment. These negative impacts, commonly called negative externalities, have traditionally been considered a natural consequence of a linear production process. Such externalities include greenhouse gas emissions, the discharge of waste into water bodies, deforestation, and harm to wildlife, local communities, or workers. At the same time, consumers, investors, and other stakeholders are putting increasing pressure on companies to adopt more responsible behaviours, in order to mitigate or eliminate these harmful effects. In this context, businesses are being called upon to rethink their societal role, redefine strategic priorities, and integrate environmental, social, and governance (ESG) considerations into their decision-making processes. This thesis is driven by the existing issues listed earlier, with the aim of exploring how increased scrutiny over companies' impacts has led to enhanced transparency for stakeholders via sustainability reporting. The union of enterprises' activities and their externalities is central in this thesis, given that nowadays it is no longer possible to imagine a world in which companies can carry on business without a single concern of their effects on people and environment, many criticisms have been raised and continue to arise. Sustainability reporting has evolved from a mere compliance exercise into a new structured strategic framework. The rationale for selecting this topic does not lie in the assumption that firms intrinsically bear greater responsibility for environmental and social impacts. Rather, it stems from the opportunities that may emerge when companies adopt a long-term and sustainability-oriented perspective, particularly within the new reporting framework that is based on the double materiality approach.

Objective and methodology

Sustainability reporting is central in this thesis, with particular attention to the newest version established by the Corporate Sustainability Reporting Directive (CSRD). The European directive was released in 2022 and formalized a new method to disclose ESG information: the double materiality approach. Double materiality is based on impacts caused by companies' activities toward environment and society, called impact materiality and the integration of environmental and social factors that affect firms' financial performance, namely financial materiality. As a result, sustainability reporting has become an integral part of corporate strategy, risk management, and stakeholder communication, ensuring transparency, accountability, and long-term value creation. This thesis aims to demonstrate the effectiveness of sustainability reporting, to not perceive it just as a mandatory report, but to highlight the actual advantages deriving from it. Due to the new approach of the sustainability reporting, companies can really understand the ESG risks that may affect them as well as the opportunities to capture. A crucial point of this work is not to confuse reputation with strategy. Even if reputation may increase with the publication of the sustainability report, and of course it represents a relevant mark for investors and other stakeholders, this thesis focuses on the strategic importance of the double materiality approach within the sustainability statement. This new perspective can help companies to understand what the ESG risks are, and from that point, they can develop a business strategy to avoid or limit them; at the same time, they see what the ESG opportunities are to catch. Thus, the disclosure provides different paths from which the company can start. The nature of this approach links the risks and opportunities assessment with the impact assessment and companies need to understand that it's not only a mere compliance, but a profitable and necessary opportunity to be more sustainable. Alongside these advantages, there are also areas of the report that remain unclear, such as the assessment of physical and transition risks, as well as the legal issues related to transparency. These two critical aspects are analysed in order to provide a broader view of this complex topic and to better understand how the reporting framework can be improved.

This work is based on a structured research process aimed at exploring the development of ESG procedures and sustainable development, as well as the evolution of sustainability reporting within the European context. The first phase of the research

focused on a review of the existing literature, including academic journals and scientific publications, to understand the conceptual foundations and historical evolution of ESG principles and sustainable development. United Nations conferences were also included, as well as the European Union's legislative proposals and directives addressing environmental transition. In the next phase, the focus shifted to the European regulatory framework for ESG reporting. This involved a detailed analysis of the directives related to sustainability disclosures, particularly the Non-Financial Reporting Directive (NFRD) and the Corporate Sustainability Reporting Directive (CSRD), together with a review of the ESRS, the standards developed by the EFRAG to draft the report. For the identification and understanding of transition risks and physical risks, the study relied on both academic contributions and official reports issued by financial and banking authorities, in order to integrate theoretical perspectives with institutional insights and industry practices. The same research approach was applied to the analysis of the trade-off between corporate transparency and ESG reporting. The existing literature on the topic was reviewed to understand how companies balance the obligation to disclose relevant non-financial information with the need to protect sensitive or confidential data. In addition to academic sources, the thesis also draws on material provided by Astrid, a foundation that has actively contributed to the understanding of this delicate balance. Lastly, in order to understand how double materiality was performed within the new sustainability report and how companies faced the main challenges related to ESG topics, a desk analysis of the Italian energy and utility sector was conducted. This specific sector was chosen due to its relevant impacts on the environment and society, but also due to the knowledge already achieved on ESG topics by companies operating in this industry. This qualitative analysis addressed five research questions concerning the current double materiality assessment and previous versions, stakeholder engagement, physical and transition risk management and sustainability governance procedures, and it was based on companies' sustainability reports from 2022 to 2024.

Development

Chapter I

Chapter I gives the necessary background to understand the growing importance of sustainability and ESG principles in shaping corporate conduct and regulatory expectations at both European and global levels. It begins with a reflection on the historical development of the sustainability concept, tracing its roots from early environmental and social concerns to its current multidimensional relevance in business and policy. The chapter then explains the evolution of ESG principles in connection with Corporate Social Responsibility (CSR), emphasizing how ESG has progressively shifted from a voluntary initiative to a key part of risk management and corporate strategy. The discussion expands to international climate conferences, examining the implications of the Paris Agreement and the objectives of the UN's Agenda 2030, with its 17 Sustainable Development Goals (SDGs) as guiding pillars for public and private actors. A central role is played by the European Green Deal, the EU's strategic roadmap for achieving climate neutrality by 2050, which links environmental sustainability with economic transformation. Then the EU Taxonomy Regulation is introduced, a classification system that defines the criteria for qualifying an economic activity as sustainable. Another directive strictly linked to the CSRD is the Corporate Sustainability Due Diligence Directive (CSDDD). It asks companies to identify, prevent, and mitigate adverse environmental and human rights impacts in their value chains. The last paragraph exposes the Europe's current position in this scenario, focusing on European green industrial policies and China's strong competitiveness in this field, this section tries to shape and understand the new emerging paradigm.

Chapter II

This section explains the role of the sustainability statement in the European Union, from its first version to the current one. It begins by examining the Non-Financial Disclosure Directive (NFRD), which laid the initial foundation for ESG reporting in the EU. While the NFRD represented a critical first step, its lack of specificity, limited scope, and flexibility in the choice of frameworks led to fragmented disclosures and poor comparability among companies. This revealed the urgent need for a stronger and

more coherent reporting system. The introduction of the Corporate Sustainability Reporting Directive (CSRD) marks a transformative moment in the European regulatory landscape. Far more than a revision of the NFRD, the CSRD represents a paradigm shift, turning sustainability reporting into a strategic and standardized obligation for thousands of European and non-European companies operating within the EU. The CSRD mandates the application of uniform standards, resolving one of the major criticisms of its predecessor: the lack of consistency and comparability in reporting practices. The current Directive also reinforces the concept of double materiality, requiring companies to disclose both how sustainability issues impact their performance (financial materiality), and how their activities affect people and the environment (impact materiality). This comprehensive approach reflects the EU's broader vision of sustainability, in which corporate transparency is not only a tool for investors but also a mechanism for accountability toward society at large. The European Financial Reporting Advisory Group (EFRAG) plays a crucial role in operationalizing the CSRD through the development of the European Sustainability Reporting Standards (ESRS). These standards aim to create a common language for sustainability reporting in Europe, ensuring high-quality, comparable, and verifiable data across sectors. Alongside this, the chapter also explores other relevant frameworks, including the GRI Standards, known for their global adoption and focus on impact, and the IFRS Sustainability Standards, developed by the ISSB to serve investor needs through financially material information. The other frameworks are still used all over the world and EFRAG is continuously working to integrate them, in order to promote interoperability.

The chapter then moves to the core of this thesis, focusing on the structured process through which organizations assess double materiality, according to the requirements set by the European Sustainability Reporting Standards (ESRS). At the centre of this process lies the IRO assessment, an integrated analysis of Impacts, Risks, and Opportunities. Companies must undertake the IRO assessment to identify which sustainability topics are material for reporting purposes. The impact assessment evaluates both actual and potential effects that a company may have on the environment, society, and human rights. The analysis emphasizes the severity of these impacts, considering their scale, scope, and irremediability. For potential impacts, the

likelihood of occurrence is also considered. On the other hand, the risk and opportunity assessment focuses on how sustainability matters can affect the company's financial position. Here, risks and opportunities are typically evaluated through a matrix combining probability and magnitude, enabling the determination of their relevance from a financial materiality perspective. A key element is the importance of governance and stakeholder engagement in the materiality assessment. Engaging with a broad range of stakeholders, including employees, suppliers, communities, and investors ensures that both the inside-out and outside-in dimensions of materiality are adequately captured. Defining the material topics is a process that works continuously with stakeholder engagement, not only for ensuring a well-designed assessment, but also in terms of audit, in fact, the auditor checks documents that state the stakeholders' and governance bodies' participation. Finally, the chapter offers a critical reflection on the challenges involved in applying double materiality, but also positive achievements and aspects. Among the main positive aspects emerges the increasing interest of companies to report ESG impacts, despite most of them would prefer to focus only on the financial materiality, seen as the most useful tool. Moreover, the research outlines the strong commitment of the large companies, especially those involved in the oil sector. However, along with these good features, even the major drawbacks emerge: risk of greenwashing and limited engagement of the most affected stakeholders, in order to avoid a too honest disclosure. In addition, there are difficulties in defining the materiality threshold, being sometimes too strict and other times too soft. Finally, the existing literature agrees in the problems related to transparency, it represents a strategic element in the non-financial disclosure, yet it may conflict with a company's conduct. The next chapter offers a more in-depth explanation of this issue, also accompanied by an explanation of the best-known climate risks: transition and physical risks, a topic that is not integrated into ESG reporting.

Chapter III

The third chapter explores the critical gaps in the current sustainability reporting framework, focusing particularly on the limitations of the CSRD and the challenges it faces when applied in real business contexts. This chapter aims to go beyond formal requirements and investigate the grey areas that still undermine the goal of effective and reliable sustainability disclosure. The first gap identified consists of the physical and transition risks assessment within the report, the second one relates to the trade-off between transparency and protection of trade secrets. The chapter initially introduces the two major categories of climate-related risks identified by the Task Force on Climate-related Financial Disclosures (TCFD): physical risks, such as extreme weather events and chronic climate changes, and transition risks, linked to the policy, market, and technological shifts associated with the green transition. An important contribution of this chapter lies in highlighting the interdependencies between physical and transition risks. Although these two risks are well known, EFRAG does not provide comprehensive instructions for measuring them. The main issue is that the organization wants companies to find and quantify these risks, but it doesn't provide an assessment model. This represents a significant gap in the sustainability reporting, threatening the principles of comparability and completeness that the CSRD itself aims to achieve. After this first criticism, two paragraphs are dedicated for the institutional investors framework and climate risks scenarios, in order to show the current models available to measure the climate-related risks. The first part of the paragraph concludes with the main challenges related to the adaptation of these models and the role of open-source frameworks.

The second part of the chapter shifts focus to one of the most delicate tensions in ESG reporting: the trade-off between transparency and the protection of trade secrets. While sustainability disclosures aim to increase corporate accountability and comparability, they may also require companies to reveal strategic or commercially sensitive information. This tension becomes particularly evident when disclosures involve transition plans, decarbonization targets, or innovation strategies. The chapter analyses this dilemma from a regulatory and legal perspective, providing a general overview of how trade secret protection is defined and enforced within the EU legal framework. It then investigates how the CSRD and the Corporate Sustainability Due Diligence

Directive (CSDDD) attempt to reconcile disclosure obligations with the legitimate interest of protecting confidential business information. An inconsistency in the regulation emerges, given the difficulty in defining where the boundary lies between protection of sensitive information and disclosure requirements. The chapter continues with an overview of the obligations and sanctions associated with sustainability reporting, but also an analysis of the parties who may be held liable within a company. Thus, the regulatory framework still lacks a mature and coordinated system of supervision and sanctioning mechanisms across Member States, which may weaken the effectiveness of the reporting obligations. The chapter ends with an analysis of the Omnibus Package, the most recent review of the current directives, collecting criticisms from industrial lobbies and other organizations that have expressed negative responses to the environmental regulations.

Chapter IV – Empirical analysis

After describing the sustainability reporting features, with its pros and cons, the final section proposes a desk analysis on the ESG disclosures of the Italian energy and utilities sector. The objective of this qualitative analysis is to find strengths and weaknesses of these reports in their first year of mandatory implementation, also considering the topics covered in the previous chapters. This sector was specifically chosen due to its strong environmental and social implications. Before delving into the desk analysis, the chapter initially discusses about Italian energy and utilities companies' sustainability reports released before the CSRD, in 2022. The paper described how these companies operated with ESG topics, and a lack of comparability emerged among the disclosures, and the presented information was more qualitative than quantitative. The analysis begins in the second section, the chosen companies are ENEL, A2A, ACEA, Alperia, Dolomiti Energia, HERA, IREN and Edison, whose sustainability reports from 2022 to 2024 are analysed. In order to find relevant information, five research questions have been developed, they address four main topics treated in each report: double materiality, stakeholder engagement, climate-risks management and sustainability governance. Here are the questions:

- RQ1: *To what extent do sustainability statements disclose the adoption of a double materiality (DM) approach prior to the introduction of the CSRD?*
- RQ2: *How has the process leading to the determination of climate impacts, risks and opportunities changed since its first pre-CSRD model?*
- RQ3: *Have any challenges been identified during the stakeholder engagement? Furthermore, who are the identified stakeholders?*
- RQ4: *Have companies disclosed the identification, measurement, and quantification of climate-related transition and physical risks under the CSRD framework?*
- RQ5: *How is sustainability governance structured following the introduction of the CSRD, with specific regard to oversight responsibilities for double materiality and sustainability reporting?*

From each question the eight answers were compared and shown in graphs or tables. Starting from the first question, almost all companies had already treated the double materiality before the CSRD release, and all of them managed to perform the IRO assessment for the 2024 disclosures. ENEL, HERA and A2A also implemented a materiality matrix to find the material IROs. No firm reported difficulties in the stakeholder engagement, apart from A2A and Alperia which faced two different issues. Anyway, all companies engaged with the following stakeholders shown in Figure 11:

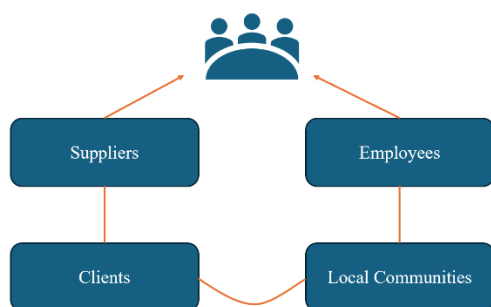


Figure 11: Stakeholders engaged by all companies

The employees and local communities involvement is particularly important, since they may be target of externalities. A significant problem stands out from the climate-risks management: this is because none of the companies showed how they measured

physical and transition risks, while only ENEL and A2A reported their expected financial effects. But at least, all firms have managed to identify these risks through different tools. Lastly, five companies out of eight have a dedicated ESG committee, which performs these tasks: sustainability plan development and CSRD disclosure support; the other companies integrated the ESG matters into other committees. The results showed a clear understanding of the double materiality and IRO assessment by all the companies, meaning that they have gained knowledge on these matters before the compliance. Overall, the companies followed a common pattern, the main challenge was the physical and transition risk quantification, confirming what emerged in the third chapter. The **most relevant findings** are:

- All the companies understood and applied double materiality correctly.
- The assessment of physical and transition risks is not yet clear.
- Larger companies are able to use more complex tools, resulting in being the most prepared for the integrated report.
- Almost every company engaged with stakeholders during the IRO assessment.
- Smaller companies do not have yet a dedicated ESG committee which oversees the report.
- Companies in the energy and utilities sector have demonstrated **adequate preparedness in the sustainability disclosure**.

Conclusions

This thesis aims to show the usefulness of the double materiality approach, required by the CSRD and developed by EFRAG. Academic papers, institutional reports and the empirical analysis showed positive results of this approach: companies enhanced transparency but also improved their financial stability and corporate strategy. However, the sustainability report has some shortcomings, especially in terms of climate risk assessment. The EFRAG does not provide a model to quantify physical and transition risks, leaving this choice to companies. The desk analysis showed what was described in Chapter III: the absence of a quantification method led companies to not show how they perform this assessment, and probably each of them used their own model expressed in the ERM. This lack compromises the principles of coherence and comparability that

CSRD pursues. Other limits emerged: companies operating in less polluting sectors are the ones less prepared to disclose this information, in fact they struggled in their first attempt, while the majority of the companies found more useful to disclose risks and opportunities than impacts. Apart from ESG risks management, also the balance between protection of trade secrets and disclosure obligations turned out to be a potential issue. The regulation is not clear about the border between protection of sensitive information and obligations to disclose information. From the analysis of this context two main concerns emerge: the approval of the Omnibus Package and the European Union's position in this global scenario. Starting from the Omnibus, it marks a significant step back, the reduction of scope and the delayed implementation were welcomed by European and US industrial lobbies. While some businesses complained about the compliance costs already borne. At a time when Europe was seeking to strengthen its position in the green transition, the reform created uncertainty. Meanwhile, China remains the leading global competitor in the production of renewable energy, due to its technological advantages and critical raw material exploitation, while Europe struggles to define a clear and coherent industrial strategy. These developments led to an important implication: uncertainty about companies now outside the CSRD scope: some may continue to apply ESRS, others may adopt other frameworks or provide limited disclosures. The ECB recommends using ESRS rather than VSME, warning that their misuse by large firms could increase greenwashing risks. This fragmentation may complicate data collection for financial institutions, forcing banks to manage inconsistent datasets and weakening ESG comparability. Financial institutions such as the ECB welcomed Omnibus simplification for reducing the unnecessary burden, but noticed that it must not weaken data quality and comparability. The ECB strongly defends the double materiality as the core principle for identifying material impacts, risks and opportunities, supporting financial stability and strategic planning. The ECB also emphasizes the need for quantitative disclosure of anticipated financial effects, warning that reduced data availability would harm systemic risk assessment.

Chapter I – Sustainability and ESG principles, meaning and evolution.

This first chapter gives an overview on the main terms of this thesis: ESG and sustainability, explaining how and why they were born and how consumers, companies and governments perceive them, in addition to this background, the work delves into the international conferences and agreements built around these two main topics. In order to simplify the analysis, the chapter only explain the regulatory landmarks occurred after 2000 in the European Union plus the Paris Agreement and the Agenda 2030, since they are crucially important for the context.

1.1 – The concept of sustainability

Sustainability is a concept that evolved over time, different authors gave their interpretation, and it has been also linked to climate change and development. The first episode in which the word “sustainability” emerged was in the 1970s, during a period characterized by several protests against the industrial society. In fact, in 1972 E. Goldsmith an authors of *The Ecologist*, published a book called *Blueprint of survival*, and here the word “sustainability” appeared for the first time as a major theme¹, it provoked several critics about the industrial society , arguing that indefinite growth is not sustainable, due to the defined number of resources.

In the same year, the United Nations during the Stockholm conference, pointed the attention on the environmental degradation, stating that it is a serious threat. Given this first concerns over the environment, United Nations created the United Nations Environmental Program (UNEP). However, the Stockholm conference did not mention the sustainability as a bullet point, but later on, in 1978, the UNEP gave a first explanation of sustainable development: it means that the needs of present and future generations must be appropriately reconciled². This definition is mainly focused on the availability the resources, so achieving a sustainable development meant ensuring the same quantity and quality of resources to the present and the future generations.

¹ Kidd, C. V. (1992). The evolution of sustainability. *Journal of Agricultural and Environmental Ethics*, 5(1), 1–26. <https://doi.org/10.1007/bf01965413>

² *REPORT OF THE GOVERNING COUNCIL on the work of its sixth session*. (1978, May). United Nations Environment Programme.

Only in the 1980s the United Nations gave a definition of sustainability equal to the current one, but this occurred after the creation of the World Commission on Environment and Development by the UN in 1983. This commission was tasked with exploring the relationship between the environment and development. The commission in 1987 published a report called *Our Common Future*, also known as the *Brundtland report*, and it included a clearer definition of sustainable development, defined as “meeting the present needs without compromising the ability of future generations to meet their needs theirs”. Along with this explanation, the report emphasized that sustainability involves managing technology, social systems and environmental limits³. The report also emphasized that the profit can no longer be separated from the consideration of social and environmental issues.

Eventually, this fundamental idea of sustainability found its way into business operations, pushing companies to take more accountable and progressive approaches. This concept evolved in the last few decades to become more quantifiable and structured, and it is now frequently built around three primary dimensions: environmental, social and governance, or ESG dimensions.

1.2 – ESG Principles and the CSR

Following the previous concept of sustainability, there is a related notion: the ESG principles. This is the acronym of Environmental, Social and Governance and they are used to measure the impact of an entity or a corporation over these 3 dimensions. The Environmental pillar refers to all the impact that the entity may have on the environment, like GHG emissions, deforestation, loss of biodiversity, energy and water management, pollution and waste management. The Social pillar concerns the impact of the corporation on the people, including workers and local communities. The impact in this instance is the protection of human rights, the gender equality, the non-discrimination and so on. The last pillar is the governance one, it only reflects the

³ *Report of the World Commission on Environment and Development: Our Common Future Towards Sustainable Development 2. Part II. Common Challenges Population and Human Resources 4.* (1987). United Nations

directors' behaviours and decisions, like employees' retributions or specialized board created to protect a specific interest.⁴

Nowadays companies' decisions made toward these 3 dimensions are becoming increasingly relevant, due to reputational matters, but also due to different advantages. At the same time, investors are increasingly interested in making investments toward businesses that take into account the ESG dimensions.

Beside the ESG dimensions, there is similar but different idea, the Corporate Social Responsibility (CSR). According to Kazmierczak(2022), the CSR is a concept in which enterprises voluntarily involve social operational concerns into their businesses and relationships with stakeholders.⁵ United Nations gave a similar definition in 2025, in fact it emerges again that "CSR is a management concept whereby companies integrate social and environmental concerns in their business operations and interactions with their stakeholders"⁶. So, what emerges is that CSR is different from the ESG Principles, the first concept just mentions the company's responsibility over social and environmental concerns, without mentioning the governance aspect, and more important, without giving a methodology to take into account those aspects. ESG, instead is a system of measurement used to detect the impact of an enterprise.

There have been different measures of the ESG impact of a company, some of those measures evolved over time, chapter 2 will deeply explain them, showing the main standards used.

1.3 – Climate Justice Before Paris Agreement: The evolution of equity in global climate governance

Before delving into the Paris Agreement (2015) and Agenda 2030 (2015), two milestones of the fight against climate-change and important acts for the sustainable

⁴ IBM. (2024, December 27). *environmental social and governance*. Ibm.com. <https://www.ibm.com/it-it/topics/environmental-social-and-governance>

⁵ KĄŻMIERCZAK, M. (2022). *A LITERATURE REVIEW ON THE DIFFERENCE BETWEEN CSR AND ESG*. SILESIAAN UNIVERSITY OF TECHNOLOGY PUBLISHING HOUSE.

⁶ UNIDO. (2025). *What is CSR?* Wwww.unido.org. <https://www.unido.org/our-focus-advancing-economic-competitiveness-competitive-trade-capacities-and-corporate-responsibility-corporate-social-responsibility-market-integration/what-csr>

development, it's important to show the positive results achieved as well as the doubts and critics emerged from each agreement and conference before that year.

After the increasing concerns related to the increase of world temperature and the continuous pollution and social injustices, All these issues have been the subject of debate since the late 1980s, both thanks to *Brundtland report* of 1987, both thanks to digitalization of information. The digitalization of data and metrics played an important role in the divulgation of pollution levels and temperature by the scientific community. Later on, as soon as the first conferences on climate change occurred, like Villach Conference in 1985 and the Noordwijk Climate Declaration in 1989, this topic became a political issue, for example by calling developed countries to finance developing ones, or by highlighting the differences between western and eastern countries⁷.

In order to analyse what happened before the Paris Agreement and Agenda 2030, it's necessary to understand the different positions of the developed countries and developing countries, and the article written by Okereke, C & Coventry, P. (2016)⁸ explains that period and in addition it explores the debates between the two parties and the common ground. The article first mentions the intergovernmental Panel on Climate Change (IPCC), created jointly by the United Nations Environment Programme (UNEP) and World Meteorological Organization (WMO). The IPCC's first report⁹ underlined the responsibilities of the industrialized countries for the current emissions and it also stated that those developed countries should give financial and technological aids to developing countries, without hindering their development. This report raised two opposite responses, the first one came from developing countries, especially China and India, which advocated for historical responsibility of western developed countries; while developed countries also invoked justice, but often resisted to additional obligations, especially if those obligations were imposed only to them, excluding developing countries. Apart from the differences between countries, there were also different perspectives within developed and developing countries. Starting from developing

⁷ Gupta, J. (2010). A history of international climate change policy. Wiley Interdisciplinary Reviews: Climate Change, 1(5), 636-653.

⁸ Okereke, C., & Coventry, P. (2016). Climate justice and the international regime: before, during, and after Paris. Wiley Interdisciplinary Reviews: Climate Change, 7(6), 834-851.

⁹ *CLIMATE CHANGE, The IPCC Response Strategies*. (1990). INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC).

countries, small island countries asked for urgent actions against climate change, and stricter emission reduction targets, given their vulnerability, China and India instead focused their rights to develop, asking for not too strict targets. Shifting to developed countries, some Nordic countries expressed their support to poorer countries, with financial and technological aids, while others, like U.S.A. doubted about these kinds of helps, stating that the solution stays in the market.

For what concerns climate acts, the United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol represented two measures with different objectives.

The UNFCCC was a treaty adopted during the Rio Conference on Environment and Development in 1992, it defined the general framework for the fight against climate change and international cooperation. it's important to note that the treaty didn't set specific targets or policies, it was just focused on the allocation of pollution responsibilities among countries, based on the principle of *common but differentiated responsibilities* (CBDR), which recognized the differing contributions and capabilities of developing and developed nations. Developing countries tended to emphasize the "differentiated responsibility", demanding for exemptions from to strong obligations and also for financial and technical assistance. From the other side, developed countries emphasized the "common" aspect of the principle, asking for an equal commitment by all the parties. Developed countries also rejected the idea of "historical responsibility", they embraced the idea of assisting poorer countries, given the lack of capital and technology. Given these contrasts, the initial CBDR principle was then transformed into *common but differentiated responsibility and respective capabilities* (CBDR + RC).

The Kyoto Protocol of 1997 was the first real attempt to fight climate change, containing first global emission reduction obligations. The Protocol basically asks to develop and developing countries to adopt policies to mitigate the emissions of GHG, without indicating a precise method, in addition it asks these countries to report periodically the data they collected. This protocol only binds developed countries, applying them thicker burdens, following the principle of "common but differentiated responsibilities and respective capabilities", a concept developed in the UNFCCC, recognizing that those yet industrialized countries are heavily responsible for the level

of GHG emissions¹⁰. Furthermore, Kyoto Protocol establishes a flexible market mechanism, based on the trade of emission permits, it consists in 3 actions:

- International Emission Trading
- Clean Development Mechanism (CDM)
- Joint Implementation (JI)

Starting from the International Emission Trading, this mechanism works by creating emission credits, they are distributed over all the participating countries, and they reflect the maximum quantity of GHG emissions that may be polluted. This system allowed those countries that emit less than their permits to sell the exceeding ones to those countries who need to pollute more, with the aim of not exceeding the established global target¹¹.

The Clean Development mechanism allows developed to implement an emission-reduction project in developing countries, and if they have actual positive effects, the countries that developed a project will earn certified emission reduction credits (CER), each equivalent to a ton of CO² (12).

The joint Implementation is very similar to the CDM, here developed that contributes or create an emission reduction project in another developed country may earn emission reduction units (ERUs), each equivalent to a tonne of CO² (13).

This Protocol came out to be divisive, in fact United States rejected to ratify it, arguing that it was unfair to not impose stricter burdens to China and India, and they also said that the focus should be on current and future emissions, not the historical pollution.

The main instrument implemented to fight climate-change and assisting non-industrialized countries were redistributive fundings. These fundings were key tools, but again, some issues emerged, regarding the amount of financing, which specific goal to prioritize, criteria of disbursement, and targets. These issues led to another division:

¹⁰ UNITED NATIONS (1997). *KYOTO PROTOCOL TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE*. United Nations

¹¹ UNFCCC. (2005). *Emissions Trading* | UNFCCC. Unfccc.int. <https://unfccc.int/process/the-kyoto-protocol/mechanisms/emissions-trading>

¹² UNFCCC. (2012). *The Clean Development Mechanism*. Unfccc.int. <https://unfccc.int/process-and-meetings/the-kyoto-protocol/mechanisms-under-the-kyoto-protocol/the-clean-development-mechanism>

¹³ UNFCCC. (2019). *Joint implementation* | UNFCCC. Unfccc.int. <https://unfccc.int/process/the-kyoto-protocol/mechanisms/joint-implementation>

where developing countries complained about the lack of adequate financing and the missing long-term goal to pursue, on the other hand developed countries argued that they were doing their best in financing, sustaining that some developing countries were free riding.

So “justice” in terms of commitment and historical pollution, was a main topic, and the discussion continued years later. During the Durban COP in 2011, all nations committed to moving towards a new climate agreement for the world by 2015 under the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP). Past attempts, like the Copenhagen COP in 2009, had collapsed because of deep divisions between developed and developing countries over what climate justice entails. The U.S.A. said that they would have rejected any deal that did not further obligate China to limit emissions, while the EU avoided to take action because it was afraid of losing its relative economic edge. In this case, China and other developing countries pushed for the principle of equity and differentiation from the Kyoto Protocol. Although the Durban Agreement does not explicitly mention equity or the CBDR principle (Common But Differentiated Responsibilities), it includes the broader commitments of the UNFCCC, including equity in the form of CBDR+RC (and Respective Capabilities). The Lima Call for Climate Action (COP20) reaffirmed that the 2015 treaty should be based on these principles, even though specific implementation mechanisms remained undecided. In the run-up to COP21 in Paris, policy debate centred on crafting a new climate regime around voluntary, nationally determined contributions (INDCs), a sharp departure from the top-down model of the Kyoto Protocol. 188 nations collectively submitted 161 INDCs, which now shape the new global architecture. Therefore, climate justice analysis now needs to take account of how equity is reflected in such voluntary contributions and whether they support equitable and ambitious climate action in the context of sustainable development. Lastly, there is increasing support for shifting the narrative from climate action as economic burden to an opportunity for green economic transition. The Capabilities approach, which highlight giving people the means and rights to live respectable lives, is also becoming more popular. The movement to better link climate policy to global inequality. Sustainable development and poverty alleviation is gaining traction.

1.4 – Paris Agreement

Later on, in 2015 the Paris Agreement is another fundamental pillar of the ESG landscape, it is a legally binding international treaty on climate change. The deal was adopted by 195 countries at the UN Climate Change Conference and entered into force on 4 November 2016.

The main goal is to maintain global warming below 2° compared to pre-industrial level, and whether is possible, to pursue efforts to limit the temperature below 1,5°. This specific agreement was a landmark, because for the first time, a binding agreement forces all 195 countries to fight the climate change. The Paris Agreement binds the participating countries to develop a five-year program in which are indicated the actions that the specific country will undertake. This program is called nationally determined contributions (NDCs), and in 2020 the participating countries have submitted their first NDCs, and now they are working on another NDC with higher environmental performances than the previous one¹⁴.

Furthermore, the Paris Agreement developed a framework for financial, technical and capacity building support, specific guidelines that nations must follow.

For financial support, the agreement states that developed countries should provide financial assistance to developing and poorer countries that have a weaker financial system. The idea is to finance measure for climate mitigation and for climate adaptation.

Moving ahead, the Paris Agreement promotes the technological enhancement, aiming to improve resilience to climate change and reducing GHG emissions. It defines a technological framework that offers strategic direction for the effective operation of the technological support.

Lastly, the capacity-building support is addressed to developing countries that haven't adequate capacity for the reduction of GHG emissions. Given that, the Paris Agreement highlights the importance on climate-related capacity-building for developing countries and requests all the developed countries to support the first ones. Moreover, the 2015 agreement established an Enhancement Transparency Framework (ETF), a platform used to report transparently actions taken for climate mitigation and adaptation and

¹⁴ *Paris Agreement*. (2015). United Nations.

other measures. The information collected through the ETF are then send to the Global Stockage, a platform that shows all the progresses achieved by the participating countries.

At the moment, the agreement has produced the following results: several countries are establishing carbon-neutral targets, and zero-carbon solutions are becoming competitive across sectors¹⁵.

These initial outcomes demonstrate the significant influence that the Paris Agreement has had in shaping national policies and encouraging international cooperation toward a more sustainable future. The treaty has established a strong basis for coordinated international action against climate change, even though obstacles still exist and progress varies among nations. By setting clear targets, encouraging transparency, and fostering support mechanisms for less developed nations, the Paris Agreement represents not just a legal commitment, but a shared global vision for environmental responsibility. As countries continue to increase their commitments through successive NDCs, the hope is that this collective effort will lead to measurable and lasting improvements in the fight against climate change.

1.5 – Agenda 2030

During 2015, another important event occurred: the adoption of the Agenda 2030. The document was adopted by 193 countries during the Sustainable Development Summit. The 2030 Agenda is based on the Millennium Development Goals (MDGs), expanding their scope and addressing their limitations by emphasizing a more comprehensive, inclusive, and integrated approach.

The Agenda is composed by 17 Sustainable Development Goals (SDG) and 169 targets to meet by 2030¹⁶. The 17 goals reflect five pillars:

¹⁵ UNFCCC. (2025). *The Paris Agreement*. United Nations Climate Change; United Nations. <https://unfccc.int/process-and-meetings/the-paris-agreement>

¹⁶ *Trasformare il nostro mondo: l'Agenda 2030 per lo Sviluppo Sostenibile*. (2015). Assemblea Generale delle Nazioni Unite.

- People: Strong commitment to fight poverty and hunger and also ensuring equal rights and dignity for every human being.
- Planet: Protection of the environment from degradation and pollution, including a sustainable management of natural resources, and a sustainable consumption and production.
- Prosperity: Determination to provide to all human being a prosperous and fulfilling life and economical, technological and social enhancement.
- Peace: Determination to foster a peaceful and inclusive society without any form of violence.
- Partnership: Ensuring global partnership means the achievement of the SDG through inclusion and cooperation among countries and communities.

Figure 1 shows the 17 goals:



Figure 1: The 17 SDG of the Agenda 2030

Note. Source: Wikipedia

The Agenda 2030 also works with targets and over 240 indicators and based on these parameters, each country is periodically assessed by the United Nations. Every year the results achieved by the 193 nations are collected in a report, the latter also shows trends on each target, stating if there have been improvements or whether some of them has been achieved¹⁷. Countries are encouraged to present Voluntary National Reviews (VNRs) to the United Nations High-Level Political Forum, offering transparency and accountability in their national implementation of the SDGs.

¹⁷ United Nations. (2015). *The 17 Sustainable Development Goals*. United Nations. <https://sdgs.un.org/goals>

The Agenda 2030 is universal and applies to all countries, regardless of their level of development, emphasizing the need for integrated action across social, environmental, and economic dimensions. One of its core principles is to “leave no one behind,” meaning that special attention must be given to the most vulnerable populations. The implementation of the Agenda requires strong commitment not only from national governments but also from regional and local institutions, private sectors, and civil society. The 17 goals are deeply interconnected and aligned with the broader framework of human rights, promoting inclusive governance, accountability, and sustainability on a global scale.

1.6 – European Green Deal

Beside the Paris Agreement and the Agenda 2030, the European Union in 2019 published the European Green Deal, an action plan aimed to reach the green transition and the climate neutrality by 2050. This Deal is the European commitment to undertake the Paris Agreement and SDG developed by the Agenda 2030.

In addition to climate neutrality, the EU Green Deal promotes a new circular economic model, in which products at the end of their life can be reused, recycled or repaired, in order to limit the waste and the resource extraction. Going ahead, the deal encourages industries to become more sustainable and more efficient for what concerns the energy consumption. Another important topic is the environment; the deal wants that countries adopt plans to restore polluted area and the development of actions to stop it. Then the Green Deal aims to reach more sustainable agricultural practises to safeguard the environment. Lastly, it encourages a plan to make the transition fair and inclusive, in order to support communities and people most affected by the transition and leave no one behind¹⁸.

The Green Deal constitutes binding rules for the EU members for a transition to a sustainable economy, and it keeps updating, in fact the European Commission in 2023 presented “The Industrial Plan of the Green Deal”, aimed to increase the competitiveness of European industries while cutting net emissions. The Industrial Plan has four pillars:

¹⁸ *The European Green Deal*. (2019). United Nations.

Simplified and more predictable regulatory framework: it aims to create a regulatory framework that ensures the availability of an adequate supply of raw materials and make sure that users can benefit from low-cost renewable energy.

More rapid access to finance: allowing enterprises an easier access on credit aimed to green transition.

Improvement of necessary competences: the increasing number of new technologies requires new skilled labour with proper competences.

Allow an equal and free trade: the European Commission developed a network of “Free trade agreements” and other cooperation forms to promote the green transition¹⁹.

A fundamental step in the implementation of the European Green Deal is represented by the “Fit for 55” package²⁰, presented by the European Commission in July 2021. This legislative package translates the climate ambitions of the Green Deal into concrete regulatory measures, with the aim of achieving a 55% reduction in greenhouse gas emissions by 2030, compared to 1990 levels. In essence, Fit for 55 defines the intermediate path to reach the final goal of climate neutrality by 2050, ensuring that all sectors of the economy contribute fairly and effectively to the green transition. The package includes a wide range of legislative reforms that affect key areas such as energy, transportation, buildings, and land use. One of its core elements is the extension and strengthening of the EU Emissions Trading System (ETS), which now also includes emissions from maritime transport and road mobility. Additionally, it introduces the Carbon Border Adjustment Mechanism (CBAM) to prevent carbon leakage and ensure that imported products comply with EU environmental standards. Another important measure is the ban on the sale of new petrol and diesel cars by 2035, accelerating the shift toward electric mobility. The Fit for 55 packages also revises the Renewable Energy Directive by increasing the binding targets for renewable energy use across member states and strengthens the Energy Efficiency Directive by requiring higher reductions in energy consumption. These legislative actions are complemented by social and economic tools to ensure that the transition remains fair and inclusive, in line with

¹⁹ *A Green Deal Industrial Plan for the Net-Zero Age*. (2023). European Commission.

²⁰ “Fit for 55”: *delivering the EU’s 2030 Climate Target on the way to climate neutrality*. (2021). European Commission.

the Green Deal's broader principles. The Social Climate Fund, for example, is designed to support vulnerable households, micro-enterprises, and transport users who may face difficulties during the energy transition. Overall, the Fit for 55 package is a cornerstone of the EU's climate strategy, aligning ambition with legislation and offering a structured roadmap toward a sustainable and carbon-neutral future.

In conclusion, the European Green Deal, together with its supporting frameworks such as the Fit for 55 packages, represents a comprehensive and dynamic strategy for reshaping the European economy toward a sustainable, inclusive, and climate-resilient model. By combining regulatory measures, economic incentives, social protections, and long-term vision, the EU is positioning itself as a global leader in climate action. However, the success of this transformation will largely depend on the effective implementation of the proposed policies, the active involvement of all stakeholders, and the capacity to adapt to emerging environmental, economic, and social challenges. The Green Deal is not only a policy roadmap, but also a shared commitment to a greener and fairer future for all Europe.

1.7 – ESG and sustainability awareness

Once understood what the meanings of ESG and sustainability are, it's also important to understand how different actors such as consumers, investors and companies have reacted and perceived this issue over time.

For what concerns the consumers perspective, the study published by McKinsey and NielsenIQ in 2023 reveals different insights²¹. This work examined the sales growth of different products with declarations that align with ESG principles in a time panel from 2017 to 2022. The data covered 600.000 individual products. At the end of the period, products making ESG-related claims accounted for 56% of all growth, and compared to products without those claims, the firsts boasted a 1.7 points advantage then the seconds. Although this first result represents a growth of sales of products with ESG-related claims, the authors made other stats about the non-uniform growth across categories. In order to demonstrate these differences, they made a bubble chart showing

²¹ Frey, S., & Bar Am, J. (2023). *Consumers care about sustainability—and back it up with their wallets*. NielsenIQ, McKinsey & Company.

growth differential vs. ESG-related claim prevalence by product category. It emerged that food products achieved a high growth differential product with ESG-related claims vs those without, while beverage products tended to have a high share of retail sales from products with ESG-related claims, whilst paper and plastic products achieved both dimensions. On contrary products like baby formula and pet foods didn't reach any growth, and the authors suggests that consumers for what concern baby and pet care, would like to ensure the best quality ever, without any concern on the product impact. Then the study gave other insights, products with more than one claim achieved a higher growth of sales than the one with one single one, in addition brand with a high percentage of ESG products (at least 50%) experienced a larger loyalty, with a buyback rate up to 34%.

In defining companies' expectations regarding ESG and sustainability, there are several implications, but in many cases, they adopt these practises for reputational or strategical reasons. Ma Q. (2024)²² conducted literature review research on the multi-dimensional effects on corporate valuation, she gave insights into investor expectations, risk mitigation and long-term value creation. The author firstly highlighted the boost coming from the disclosure of sustainability report, this enhances investors' confidence in the companies' governance. In addition, companies appear more transparent by giving detailed information of their impacts on environment and society, reducing the information asymmetry. All these features can be translated into an increase of profitability indicators, as analysed by Varvara, N. & Victoria, L. (2022)²³ who examined a sample of S&P 500 American and S&P 350 European companies in the period between 2010 and 2020. They examined the relationship between ESG performance and investment attractiveness, expressed by Tobin's Q, ROE, cost of capital and probability of paying dividends, the results showed that companies having an ESG performance above the median experienced greater ROE, Tobin's Q values compared to the counterparties below the median. Ma Q.'s research continued with the long-term strategy, stating that non-financial disclosure supports the definition of

²² Ma, Q. (2024). Exploring the multi-dimensional effects of ESG on corporate valuation: Insights into investor expectations, risk mitigation, and long-term value creation. *Advances in Economics, Management and Political Sciences*, 103(1), 8-15.

²³ Varvara, N., & Victoria, L. (2022). Do ESG factors influence investment attractiveness of the public companies? *Корпоративные финансы*, 16(1), 38-64.

corporate innovation activities toward sustainable development. In fact, the study affirms that implementing a business developed around environmental and social dimensions may help the company in the achievement of a competitive advantage in the long run. To conclude the author underlines the costs of adaptation: companies may face higher costs, especially external consultant needed for the definition of business strategy and innovation costs. Enterprises need to find a balance between cost efficiency and performance, and in order to do so, a deep cost-benefit analysis is essential, beside they also need to adjust the ESG performance every year, and this will also be costly.

What about firms that only care about reputation over ESG concerns? These are the companies that keep focusing on the brand image, without the integration of sustainability measures. The Analysis of ¹ Nicolas, M. and others (2024)²⁴ delves into the reputational risks arising from an unfair firm's behaviour, focusing only on the impact of social media. They found that market tends to penalize companies that do not integrate environmental, social and governance considerations into their values and corporate governance frameworks, even if there had not been concrete negative events or scandals. Furthermore, they noticed that "cleaning" the brand image with fair slogans published on the social media only to increase reputation is not enough, in fact some investors go beyond the appearance and really look for companies with a strategic commitment. All in all, reputation and strategy involve bring different results, and firms tend to choose the option they prefer. But the truth is that while reputation is linked to perception, strategy is an actual commitment and long-term process. The process of creation of a business plan also include reputation, indeed the implementation of the first indirectly boost the second. To be more precise, creating a, ESG strategy means increasing firm's strength, resilience and also reputation.

1.8 – EU Taxonomy

The acts described in the previous paragraphs represent important milestones which have defined the approach toward climate-change mitigation and ESG adaptation. Among the proposals developed by the European Commission, there is the EU

²⁴ Nicolas, M. L., Desroziers, A., Caccioli, F., & Aste, T. (2024). ESG reputation risk matters: An event study based on social media data. *Finance Research Letters*, 59, 104712.

Taxonomy, a classification system that defines whether an economic activity can be definite “environmentally sustainable”, so it addresses to sustainable finance. This classification was developed within the REGULATION (EU) 2020/852 of the European parliament and of the council of 18 June 2020²⁵. EU created a tool aimed to help investors and companies in recognizing the actual environmentally sustainable activities and it aligns with the Green Deal objectives.

An activity can be taxonomy-aligned if it:

- 1) Makes a substantial contribution to one or more of the six EU’s climate and environmental objectives.
- 2) Does not significantly harm any of the climate and environmental objectives.
- 3) Complies with minimum social safeguards.
- 4) Satisfies the technical screening criteria defined in the Taxonomy delegated acts.

These four alignments make reference to different schemes, so in order to explain each of them, the first one mentioned is the list of the “EU climate and environmental objectives”, they are six and consist in:

- Climate change mitigation
- Climate change adaptation
- Sustainable use and protection of water and marine resources
- Transition to a circular economy
- Pollution prevention and control
- Protection and restoration of biodiversity and ecosystems

Moving on, the minimum social safeguards cited in the third alignment refers to OECD Guidelines for MNEs and the UN Guiding Principles on Business & Human Rights.

Lastly, the Taxonomy delegated acts are guidelines adopted by the European Commission, these acts detail the thresholds, indicators and environmental conditions that economic activities must meet to be considered “taxonomy-aligned”.

²⁵ REGULATION (EU) 2020/852 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 June 2020 on the establishment of a framework to facilitate sustainable investment and amending Regulation (EU) 2019/2088 (Text with EEA relevance). (2020). European Parliament.

The EU Taxonomy is not mandatory, and it doesn't refer to firms' financial performance. The Taxonomy serves as a key facilitator of the EU Green Deal, by directing capital flows toward economic activities that support the decarbonization and ecological transition of the European economy. Even if it's not mandatory, the Corporate Social Responsibility Directive (CSRD) obliges companies under its scope to report in the non-financial disclosure how much of their operations are covered by the EU Taxonomy (Taxonomy-Eligible) and meet the standards established in the taxonomy delegated acts (Taxonomy-alignment)²⁶.

After three years from the publication of the REGULATION (EU) 2020/852, some companies started aligning to the EU Taxonomy, and the EU Commission registered the first results in a brief report named *The EU Taxonomy's uptake on the ground*²⁷. It highlights that company have started using the Taxonomy to plan green investments and on average 20% of companies' capital investments are aligned with it, the highest investment is made in the utility sector, especially toward electricity providers. The document also pointed out that In 2023, approximately 600 European companies reported a total of €191 billion in capital investments aligned with the EU Taxonomy. As of 6 May 2024, reported investments have already reached €249 billion, indicating strong year-over-year growth. This brings the combined total for 2023 and early 2024 to approximately €440 billion. These figures are expected to rise further as companies begin reporting under the four additional environmental objectives of the Taxonomy, thereby expanding the range of eligible activities and reporting entities.

1.9 – EU Corporate Social Due Diligence Disclosure (CSDDD)

Beside the reporting framework established with the CSRD, which aims to guide companies in disclosing sustainability-related information in a consistent and transparent manner, there is also the Corporate Social Due Diligence Disclosure

²⁶ *DIRECTIVE (EU) 2022/2464 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL*. (2022, December 14). European Parliament.

²⁷ *The EU Taxonomy's uptake on the ground*. (2024). European Commission.

Directive (CSDDD)²⁸. This directive requires companies to carry out comprehensive due diligence process to identify, limit, mitigate and account for adverse negative impacts on human rights and the environment, even considering operation in the value chain. the CSDDD follows and cites the framework of the United Nations Guiding Principles on Businesses and Human Rights, it basically asks companies to incorporate human rights due diligence into policies.

The Directive entered into force on 25 July 2024, and member states must transpose it by July 2026, it focuses on the identification and management of both potential and actual negative impacts on society and environment. This duty applies to company's operations, its subsidiaries and also important operators involved in the up-stream and down-stream value chain. The Directive also requires large company to develop and implement, using the best practises, an action plan aimed to reach the climate neutrality by 2050, in line with the Paris Agreement and European Climate Law.

The norm gives three steps to follow:

- 1) companies must identify and assess which operations cause adverse actual and potential environmental and human rights impacts:
 - within their operations
 - across their subsidiaries
 - across the supply chain
- 2) Prevention and mitigation of potential impacts, so if the event is likely to occur, companies should adjust internal processes, ask to business partners to comply with company's code of conduct and also support those partners that find difficulties in the adaptation. Companies may also consider suspending business relationships with risky partners if they are unable to adapt.
- 3) Take actions to eliminate or limit actual adverse impacts. If it is possible, companies can propose a remediation or compensation to affected parties.

The CSDDD will apply to:

²⁸ *DIRECTIVE (EU) 2024/1760 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on corporate sustainability due diligence and amending Directive (EU) 2019/1937 and Regulation (EU) 2023/2859. (2024). European Parliament.*

- Large EU limited liability companies & partnerships that meet both of the following criteria:
 - o Have more than 1000 employees, AND.
 - o Generate more than €450 million of net turnover.
- Large non-EU companies that:
 - o Generate more than €450 million of net turnover earned in the European markets.

This Directive doesn't address to SMEs; however, it provides supporting and protecting measures for them and SMCs (Small Midcaps Companies).

Shifting to the supervision of the conduct, the Directive requires each country to institute a supervisory authority in charge of verifying that companies follow the obligations. This bodies will detect whether the companies adopt a correct conduct, in case of non-compliance, the norm imposes penalties up to 5% of the net turnover of the non-compliant company. The national supervisory bodies will be coordinated by a European network of supervisory authorities, in order to ensure a single application for every member state.

This norm has raised different critics and questions, Mieszkowska, J. (2024)²⁹ states that this directive may create indirect failures. The bigger issue regards the loss of commercial partners, in case the latter are not compliant with CSDDD, for example suppliers located in developing countries where human rights, and in general, employees' rights are not ensured. When a company exclude these partners, finding new ones may be difficult. The paper also outlines that SMEs may face difficulties in adapting to the Directive. Even if they are not under the scope of the CSDDD, if they are part of a business relationship with a large company that decides to withdraw due to compliance concerns, this could be a significant loss for small and medium-sized companies.

Even though CSDDD and CSRD are different, they are part of the same process. It's clear by now that CSRD requires company to report data and information, while CSDDD requires companies to adopt concrete measures to identify, limit, prevent and

²⁹ Mieszkowska, J. (2024). The Unintended Consequences of the EU Corporate Sustainability Due Diligence Directive. *AJIL Unbound*, 118, 291–296. doi: 10.1017/aju.2024.48

eliminate negative effects of their own operations, inside and outside Europe. To conclude, the CSDDD is another important step and along with the CSRD, it gives a direction to the European companies.

1.10 – Sustainability nowadays: doubts, strengths, industrial policies and a new paradigm

The previous paragraphs lead to a final question: how is sustainability and climate change perceived across countries? The question arises because of the actual concerns matured around this delicate topic. Even if there is scientific evidence which confirms the urgency of the climate crisis, governments and big multinationals struggle in finding a solution, due to the complexity of this subject but especially because of the conflict of interests, in fact sustainability is still seen as a threat, even in western countries. This last section navigates around all the opinions and critics regarding climate change and sustainable development, trying to offer a clearer view of this scenario and suggesting an insight for enhancing Europe position.

First of all, Europe through important directives has established a regulatory burden to be respected. The Green Deal, followed by the most relevant directives on this field, CSDDD and CSRD, have radically changed the future of European companies. These changes have been received differently by different actors as shown the Financial Time article written by Pitel L. (2025)³⁰. It collects different negative points of view, for example, Christian Bruch, CEO of Siemens Energy argues that EU directives impose a burden that is widely disproportionate to their benefits, and this measures will lead to a significant loss of competitiveness, making European companies less attractive compared with global rivals like China and US, the latter, under Donald Trump, moves decisively away from ESG-oriented policies. In addition, even German, Italian and French industrial lobbies moved the same critics, they fear a loss of competitiveness too, and they asked EU to simplify the rules, while Valdis Dombrovskis, the EU's economy commissioner thinks that the problem is not the regulation, but rather is bureaucracy that need to be reduced. The EU Commission after this multiple concerns

³⁰ Pitel, Laura. "EU "Completely Overshooting" on Green Rules, Siemens Energy Boss Warns." *@FinancialTimes*, Financial Times, 12 Feb. 2025, <https://www.ft.com/content/98241f9c-7b98-4267-b073-2a2c57a3a548>

recognized the problem, in fact in January 2025 they published “A Competitiveness Compass for the EU”³¹, a document in which they talk about different factors that are affecting competitiveness in Europe, offering possible solutions to boost the productivity of the European firms. They underline a too heavy regulatory framework that discourage long-period investments. The Commission states that decarbonation must be competitiveness-friendly and technology-neutral.

Another question that arises among different stakeholders is: “Does the green industrial policies align with the actual needs of the EU countries and companies?”. This question and other similar ones have been asked by the European Court of Auditors in their publication³². Within the document, several implicit yet substantive critiques of the EU’s green policies emerge, particularly concerning their alignment with the different needs, capacities, and industrial structures of the member states. While the objective of the European Green Deal is consistently reaffirmed as necessary and legitimate, the text repeatedly highlights a growing gap between ambitious climate targets and the practical conditions required for their implementation. A central concern is that decarbonisation goals are often pursued without sufficient consideration of existing industrial capacity, technological maturity, and infrastructure readiness at national level, as illustrated by the case of electric mobility and the EU battery value chain. Here, stringent regulatory timelines coexist with continued dependence on extra-EU suppliers, especially China, raising doubts about both feasibility and strategic autonomy. Moreover, the document points to the “one-size-fits-all” nature of EU green regulation, which inadequately reflects divergent national energy mixes, fiscal capacities, and economic structures, thereby risking a fragmented transition in which wealthier member states are better positioned to comply and benefit. This fragmentation is further boosted by uneven implementation and enforcement of EU rules, generating regulatory uncertainty and undermining the scalability of green solutions across the single market. The text also warns against the risk of green-driven deindustrialisation, whereby strict environmental standards, if not matched by coherent industrial policy instruments, may incentivise relocation of production outside the EU, potentially worsening global emissions rather

³¹ *A Competitiveness Compass for the EU*. (2025). European Commission.

³² *EU industrial policy - the solution to various dilemmas?* (2024). European Court of Auditors.

than reducing them. At a deeper level, the document advances a more structural critique of EU policymaking, suggesting a tendency to conflate objectives with instruments: while climate goals are clearly defined, policy design too often relies on prescriptive regulation and premature technological choices rather than on creating enabling conditions for innovation, experimentation, and market-driven adaptation. Overall, the critique articulated in the document does not challenge the necessity of the green transition itself, but rather underscores that without stronger coordination, industrial realism, and sensitivity to member state diversity, EU green policies risk becoming internally inconsistent and misaligned with the economic and social realities they seek to transform.

Last crucial point emerged regards the dependencies from other countries, especially from China. Renewable energy sources, in order to be built, requires special minerals called “critical minerals”, these ones are not rare to be found, but there is a strong difficulty in their identification, extraction and purification. China and other Asian countries already started this process some years ago, as highlighted by Ford N. (2026)³³, in a Reuters article called “Europe falling behind critical minerals race”. In 2024 the 95% of critical minerals imports came from China, Malesia and Russia according to Eurostat. Basically, EU clean energy developers are radically dependent on Chinese minerals, this arises a lot of risks: project delays due to the strict control on importation, but also inflation risk, since Europe itself can’t satisfy its demand. Thus, in order to cover this gap, Europe launched the “Resource EU” program in December 2025, aiming to increment the extraction in the European territory and to promote recycling to reduce dependence from dominant suppliers. Backed by €3 billion under the 2024 Critical Raw Materials Act (CRMA), the plan sets targets for 2030, including sourcing 10% of critical minerals through domestic extraction, hosting 40% of global processing capacity within the EU, and achieving a minimum recycling rate of 15%, alongside faster permitting procedures. However, several analysts argue that the CRMA relies largely on existing funding and lacks sufficient financial instruments to materially improve project bankability. As a result, Europe remains highly dependent on

³³ Ford, N. (2026). Europe falling behind in critical minerals race. *Reuters*.
<https://www.reuters.com/business/energy/europe-falling-behind-critical-minerals-race--reeji-2026-01-12/>

concentrated global supply chains, with China and Indonesia dominating key minerals such as rare earths, lithium, and nickel. Permitting delays continue to hinder strategic projects within the EU, while recycling markets remain fragmented. By contrast, the United States has pursued a more security-driven and incentive-based approach, deploying extensive fiscal tools under the Inflation Reduction Act and subsequent legislation to de-risk projects and accelerate supply chain development. Overall, Europe's limited public risk-sharing mechanisms and slower implementation pace continue to constrain progress toward supply diversification and strategic autonomy in critical minerals.

The green regulations seem to be too strict and not aligned with EU members' needs and capacities. Furthermore, this scenario puts Europe in a difficult position, between large and more powerful actors: The US, Russia and China, and the more Europe moves toward sustainability, the more it advantages the Asian countries. So, some questions arise: Do Europe and western countries need to stop focusing on sustainability and climate change fight? Is climate change a real problem or just a trend?

The scientific evidence has shown over time the negative impacts of fossil fuels on air and environment, as well as the impact of pollution caused by companies and consumers. Stopping once for all the process of becoming more sustainable is not the key, some positive results have been already achieved, but Europe lags, so it needs to find a position in this scenario. First of all, western countries need to accept the current paradigm shift, which is not something so new, it has already started, as reported by the International Renewable Energy Agency (IRENA) in 2019 in its document called "A new World: The Geopolitics of the Energy Transformation"³⁴. This report confirms different changes and shifts of the energy supply and demand, first of all the main idea is that the global energy system is undergoing a structural transformation driven by the rapid growth of renewable energy. Falling technology costs, innovation, and climate-related pressures have made this transition increasingly irreversible. Beyond the energy sector, the transformation is reshaping economic systems, social dynamics, and international relations. The energy transition is based on three main pillars: energy

³⁴ *A New World: The Geopolitics of the Energy Transformation*. (2019). IRENA.

efficiency, large-scale distribution of renewable energy, and the electrification of end-use sectors such as transport and buildings. Together, these trends reduce dependence on fossil fuels and support pathways consistent with international climate objectives. Then, the document analyses the geopolitical factors around this matter, renewable energy differs fundamentally from fossil fuels in geopolitical terms. Renewable resources are widely distributed, reducing reliance on geographically concentrated reserves and strategic supply routes and the nature of critical minerals enhances energy security. As a result, the energy transition is redrawing the global geopolitical map. Fossil fuel importing countries are likely to gain energy security, economic resilience, and greater strategic autonomy. In contrast, fossil fuel exporting states face economic and political risks if declining demand erodes public revenues, making diversification and institutional reform essential. The report underlines the strong leadership of China in this sector, stating that countries that succeed in innovation, manufacturing, and deployment of renewable technologies are better positioned to enhance their global economic and political standing.

IRENA shows properly how energy transition is occurring, while in another report, called “Regional energy transition outlook: European Union” (2025)³⁵, it tries to explain how Europe should move, formulating some hypothesis. The text starts by saying that Europe needs to shift to a greener economy based on renewable energies, not just because “green is better”, it’s the current paradigm that force the EU to find an energy system based on renewables with low operating costs represents the only structurally viable way to reduce Europe’s exposure to geopolitical shocks and price volatility, it’s a long-term investment. They propose a central hypothesis: competition in the energy transition is not primarily about individual technologies, but about integrated systems. Europe is unlikely to prevail in a contest based on industrial scale against global leaders such as China, whose advantages in manufacturing volume, cost structures and vertical integration are difficult to replicate. Rather than seeking to reproduce external models, the European strategy is oriented towards becoming a leader in system integration, reliability and predictability. Consequently, competitiveness is measured less by unit production costs of specific technologies and more by system-level outcomes, including

³⁵ *Regional energy transition outlook: European Union* (2025). IRENA.

average electricity prices, price stability, infrastructure resilience and the capacity to integrate high shares of variable renewables without compromising security or efficiency. Within this framework, early investment in networks, interconnections, storage and well-designed markets is not ancillary, but a precondition for a cost-effective and resilient transition. A similar non-ideological approach applies to green hydrogen, which is positioned as a strategic vector only in sectors where direct electrification is technically or economically unfeasible. Treating hydrogen as a universal solution would increase system-wide costs and dilute scarce resources. Moreover, Europe implicitly recognises its structural limitations in access to critical raw materials and low-cost hydrogen production, choosing not to compete directly where others possess clear natural or scale advantages. Instead, the emphasis is placed on external partnerships, diversified supply chains and geopolitical resilience. In this context, the energy transition becomes inseparable from industrial policy, not as a form of rigid protectionism or technological autarky, but as an alignment between energy infrastructure, market design, investment flows and strategic industrial sectors. Energy thus emerges as a core determinant of industrial competitiveness rather than solely an environmental policy objective. Nevertheless, the most critical challenge remains internal. Fragmentation among Member States, slow permitting procedures, uneven implementation and limited enforcement capacity threaten to undermine even a conceptually robust strategy. Ultimately, Europe's approach does not seek to win the same competition as other global actors, but to redefine the terms of competition by prioritising system efficiency, stability and integration. This strategy is rational but not guaranteed to succeed, as it depends on Europe's ability to transform internal complexity from a structural constraint into a source of competitive advantage.

This last section aimed to describe a delicate situation in which Europe is struggling to position itself. It's clear that a shift toward sustainability cannot be denied, indeed it needs to be understood and also exploited. Furthermore, the paragraphs try to predict a possible future in which the EU doesn't compete with China, Russia and the US in the same field, yet it need to participate in the energy transition focusing on system efficiency.

Chapter II – Sustainability Report and its regulatory framework

Sustainability has evolved from a marginal concept into a core component of corporate strategy and governance. Alongside this change, stakeholders, investors, and regulators have become more demanding that businesses reveal their environmental, social and governance (ESG) effects. As a result, sustainability reporting, especially in the European Union, has changed from being a voluntary and frequently irregular activity to a standardized and controlled one. This development is examined in the following paragraphs, they look at how sustainability disclosures have changed from qualitative, unstructured documents, to reports subject to legally reporting standards. From early voluntary initiatives to the implementation of Non-Financial Reporting Directive (NFRD) to the current provision, the Corporate Sustainability Reporting Directive (CSRD), the chapter describes the development of non-financial reporting in Europe. It also presents the role of key organizations and standards, such as EFRAG, the ESRS, the GRI, and ISSB, in shaping the current regulatory landscape.

After a detailed description of these frameworks, the chapter points the attention on the double materiality, analysing its functioning and showing why it has radically changed the way companies are reporting. This second part focuses on the IROs assessment and the core role of the combination of financial and impact assessment.

Through this historical and regulatory overview, the chapter aims to provide the necessary context for understanding the current challenges and opportunities in corporate sustainability reporting, while highlighting the EU's effort to improve transparency, comparability, and reliability of ESG information.

2.1 – Before the compliance

The sustainability statement, also called sustainability report, is a document that assesses impact and performances regarding environmental, social and governance dimensions of a company. As happened for the term “sustainability”, this disclosure has experienced a different meanings and interpretation over time. Before being compliant in the European Union, due to the Directive 2014/95/UE, the sustainability assessment

was a voluntary disclosure, without a specific scope, it was a mere communication to stakeholders about company's non-financial performance.

As of 2008, several states have highlighted the importance of financial stability and sustainability and have started to develop something far from nowadays reporting framework, but an initial stage of this process, Doni F. et al (2019)³⁶ has provided a background on this topic. The US Commission in 2010 published a guidance regarding disclosure of climate-change concerns, focusing on Europe, Denmark promulgated in 2008 the Danish Financial Statements Act to stimulate Danish companies to disclose non-financial information and acting in a socially responsible way. In the same year, in Spain, the government issued a law that obliged certain companies to disclose non-financial information within their corporate reporting. All these measures didn't require companies to disclose a sustainability report, let alone a precise framework to follow.

Nevertheless, moving to the voluntary non-financial reporting before 2014, the literature provides different insights. Managers recognized the growing interest on climate-change, sustainability and environmental and social factors by different stakeholders, so they started to take care about stakeholder engagement, involving in the company's decision processes for corporate social responsibility activities. However, the initial disclosures were often lacking in terms of quality, since managers tended to report ongoing activities and presumed results. In some cases, this even led to episodes of greenwashing, a misleading practice aimed to make people believe that a company is really committed in protecting the environment than it really is (Siano et al., 2017)³⁷. Moreover, Venturelli, A. et al (2019)³⁸ listed what that non-financial disclosure needed in order to be reliable, they should have had guidelines and the assurance by third parties.

³⁶ Doni, F., Martini, S., Corvino, A., & Mazzoni, M. (2019). Voluntary versus mandatory non-financial disclosure EU Directive 95/2014 and sustainability reporting practices based on empirical evidence from Italy Non-financial disclosure. *Meditari Accountancy Research*, 28(5). <https://doi.org/10.1108/MEDAR-12-2018-0423>

³⁷ Siano, A., Vollero, A., Conte, F., & Amabile, S. (2017). "More than words": Expanding the taxonomy of greenwashing after the Volkswagen scandal. *Journal of business research*, 71, 27-37.

³⁸ Venturelli, A., Caputo, F., Leopizzi, R., & Pizzi, S. (2019). The state of art of corporate social disclosure before the introduction of non-financial reporting directive: a cross-country analysis. *Social responsibility journal*, 15(4), 409-423.

Thus, to produce a precise and coherent disclosure, although voluntary, some companies decided to adopt standards for non-financial disclosure, the study carried out by Mio, C. (2010)³⁹ wanted to investigate how and which Italian companies decides to voluntary disclose non-financial information, detecting the frameworks used and the results provided. The results emerged from the study were the following: the companies that used to disclose that information were the bigger ones, in terms of number of employees and turnover, as well as those having different subsidiaries spread all over the world and even those companies with high environmental impact (like utilities companies). The reasons behind the reporting are various: reputation, increase of transparency, management of stakeholder relationship, benchmarking and also to prepare their self for future binding regulation. Moving on, the most of enterprises used the Global Reporting Initiative (GRI) standards framework, even if many time it was a partial and not rigorous disclosure. Rarely, enterprises adopted the AA1000 standard, aimed to enhance the stakeholder engagement, other ones adopted the SA8000, standards dedicated to human rights and work conditions and to conclude, just a few companies used national guidelines or internal models to report, given the lack of competences or the bad preparation over ESG disclosure. The main results after the first disclosure weren't so consistent, there was big heterogeneity regarding contents, format and frequency of disclosing, the most frequently disclosed areas were environment, workers and local stakeholders and only a few enterprises offered quantitative comparable data. From this analysis multiple gaps emerged:

- Poor comparability: enterprises decided what topics to disclose, without following a common method.
- Missing standardization: companies which decided to adopt a framework like GRI standards, didn't fully implement it, it resulted a partial or shallow reporting.
- Poor transparency: companies chose quality over quantity, without showing any evidence, this issue is then lead also to the next one: self-promotion, they used the report just to show the company's CSR, hoping for an increase of reputation.

³⁹ Mio, C. (2010). Corporate social reporting in Italian multi-utility companies: An empirical analysis. *Corporate Social Responsibility and Environmental Management*, 17(5), 247-271.

- Difficulties in external valuation: stakeholders, assurer and regulators struggled in finding evidence and real impacts and environmental and social performances.

Thus, this study demonstrated that reporting without a unique method and framework leads to many inconsistencies, but a part from the results, it emerged that the non-financial disclosure was not perceived as an annual report as the financial statement, companies meant to disclose a document in which CSR company's activities were shown without quantitative basis, in fact, qualitative information were preferred. These issues were observed in different countries, and Europe understood the importance of regulating an uncovered area, and the first norm regarding the non-financial disclosure occurred in 2013 with the Directive 2013/34/UE, its objectives were to enhance the clarity and comparability of sustainability statements, to reduce administrative burdens with simple rules and improve transparency⁴⁰. This directive was modified one year later with the Non-Financial Reporting Directive, an important step for this cause, and it will be better discussed in the next paragraph.

2.2 – First step: the Non-Financial Disclosure Directive (NFRD)

The limitation of voluntary disclosure prompted the European Union to introduce the Directive 2014/95 EU, also named Non-financial Reporting Directive⁴¹, that modifies the previous Directive 2013/34/UE, it entered into force in 2017. This first Directive aimed to require certain companies to disclose non-financial information regarding impacts, performances updates to investors and other stakeholders. It was applied to all companies with more than 500 employees, and specifically these “non-financial information” regarded environmental topics, social aspects and worker treatment, human rights respect and finally information concerning fight against corruption and practises implemented. Then in the final disclosure, companies would have shown KPIs, risk management practices and other outcomes relevant to the business.

⁴⁰ *DIRECTIVE 2013/34/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL* of 26 June 2013. (2013). European Parliament.

⁴¹ *Non-Financial Reporting Directive*. (2014). European Parliament.

With the adoption of the Green Deal on December 2019, the Commission announced to review the NFRD; in order to improve the foundations for sustainable investments, it made a survey from February to June 2020 it collected thoughts, opinions and critics of different stakeholders regarding a revision of the directive. It emerged that the directive lacked in terms of comparability, reliability and relevance of the non-financial reports provided, thus the commission indicated the first trimester of 2021 as a deadline for the provision of another updated directive.

Step by step, the document published by the European Parliament called “Briefing Implementation Appraisal” describes how has been changed the NFRD⁴². The paper sustains that NFRD is a first step toward greater business transparency for social and environmental matters, when the directive came into force, many issues raised. First of all, there weren’t particular information available about how many non-financial issues and sustainability issues may impact companies, vice versa, companies themselves didn’t know which impacts they provoked to the environment or society. Secondly, corporations often faced many avoidable costs when they are deciding which information to disclose, so it emerged difficulties in understanding how to disclose and what. The NFRD gave much flexibility in the implementation of its provisions, without requiring a unique framework, nor a methodology to follow while collecting information. Regarding reporting framework standards, companies could select among these standard issuers: Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), the International Integrated Reporting Framework (IIRC), the Task Force on Climate related Financial Disclosures (TCFD), the United Nations (UN) Guiding Principles Reporting Framework, the UN Global Compact, the OECD guidelines for multinational enterprises and ISO 26000.

From February to June 2020 the EU Commission conducted surveys, interviews and meeting with different stakeholder in order to collect thoughts about the NFRD, and by the end of that period 588 responses were collected and then written in a summary report. The stakeholders that participated to the survey were enterprises (70% of them

⁴² *BRIEFING Implementation Appraisal*. (2021). European Parliament.

were big), business associations and NGOs. The summary report showed these key messages:

- in terms of quality and scope of the information disclosed, both users and issuers found difficulties in comparing data with other non-financial reports, and also issues related to reliability and relevance if information provided.
- 82% of respondents asked for the adoption of a single common reporting framework, and some of them agreed on the provisions of simplified standards for SMEs.
- 67% of the respondent, especially investors and NGOs asked for stricter audit controls. All categories agreed in paying a reasonable price for this kind of audit, 50.000€
- Strong demand for digitalization of the non-financial information: 64% of the respondents believed that tagging the information provided would be useful, so that digital machines would find easier to read them (allowing also an easier audit).
- 72% of the respondents requested companies to show their materiality assessment process. It's important to underline that many national standards setters supported the double materiality assessment, introduced in June 2019 as a non-binding guideline, even though they recognize that the concept needs further explanations.
- Last key message emerged regards the application of the NFRD to other entities, especially large companies not established in the EU, but listed in EU markets; large non-listed companies; large companies established in the EU, but listed outside the EU, and so on. Moreover, most respondents expressed that SMEs needed a special treatment in proportion to their size.

To conclude, the European Parliament had already called for some revisions in 2018, and then after the survey period, confirmed those critics: development for further ESG requirements, addition of indicators for the measurement of sustainability impacts and also risk and opportunities and lastly, the necessity of auditing. Moreover, in December 2020, the EU parliament made other recommendations: the implementation of mandatory standards and the application of the directive for all large listed and unlisted companies established in the EU. Finally, Parliament asked the Commission to identify

potential high risky sectors with significant impact on ESG dimensions, in order to understand whether is necessary to include also SMEs operating in these sectors.

Then through the CSRD, the “non-financial disclosure” took another meaning.

2.3 – The current regulation: Corporate Social Responsibility Directive (CSRD)

After the review and the discussions on the Non-Financial Disclosure Directive, the European Parliament stated that the directive lacked in terms of comparability, reliance and relevance of the information. Thus, the EU Commission introduced the CSRD as a new framework to guide companies to disclose a more consistent non-financial report, easier to read and understand, and above all, easy to compare ESG information with other companies’ reports.

So, along with new agreements stipulated, the European Parliament published on 14 December 2022 the Corporate Sustainability Reporting Directive⁴³, a new modification of the NFRD of 2014. The Directive came into force from January 2023, it requires EU business, including qualifying EU subsidiaries of non-EU companies, to disclose their environmental, social and governance impacts and vice-versa how ESG dimensions may affect the business, which is basically the double materiality assessment. In this instance, the text of the CSRD is based on the concept of double materiality as a method to disclose information, it consists in two approaches “inside-out approach”, that is the impacts provoked by the companies on the environment and society; and the “outside-in approach”, the effects caused by environmental and social events that may provoke consequences on the business. Then the norm shows all companies obliged to disclose: listed companies (except “micro undertakings”), all large EU companies (those having at least 250 employees, 50 million euros of net turnover, 25 million euros in total assets) and “third country” companies, meaning all non-EU parent companies that have produced at least 150 million of revenues in EU in the last two years.

⁴³ *DIRECTIVE (EU) 2022/2464 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL*. (2022, December 14). European Parliament.

- The first companies obliged to disclose are the ones already compliant with the NFRD, those companies started reporting in 2025 data of the previous fiscal year.
- Then in 2026, large enterprises non-compliant with NFRD, that satisfies at least 2 out of 3 of these criteria:
 - o More than 250 employees
 - o More than €40 million in turnover
 - o More than €20 million of total assets

So, these companies will disclose information about 2025.

- In 2027, listed SMNs (but not microenterprises), non-complex credit institutions and captive insurances will disclose information about 2026.
- Lastly, in 2029, non-EU enterprises with a turnover larger than €150 million earned in the EU markets AND at least one significant subsidiary in Europe, will disclose information about 2028.

The CSRD covered different lacks occurred in the NFRD, and IBM website⁴⁴ helps in finding them. The First one is the audit on the non-financial information disclosed, the previous directive didn't obliged companies to receive an audit, now it's mandatory, the norm requires auditor to provide limited assurance on the data disclosed. Furthermore, the CSRD applies for many other kinds of businesses than the NFRD. Then, the CSRD reporting is based on the report of targets, risk (KRI) and opportunities (KPI), with a focus on forward planning, while the NFRD didn't have a precise scope, giving more flexibility to companies on how to disclose. For what concerns the report it-self, the current norm requires a separated report form the financial annual report, the previous one gave the possibility to include non-financial information in the annual report.

Moving on, the CSRD specifies that member states too have an investigative entity aimed to find any irregularity and then, to impose an effective and proportionate penalty. Penalties are based on the gravity and longevity of the irregularity. So, each member state should define a law and authority.

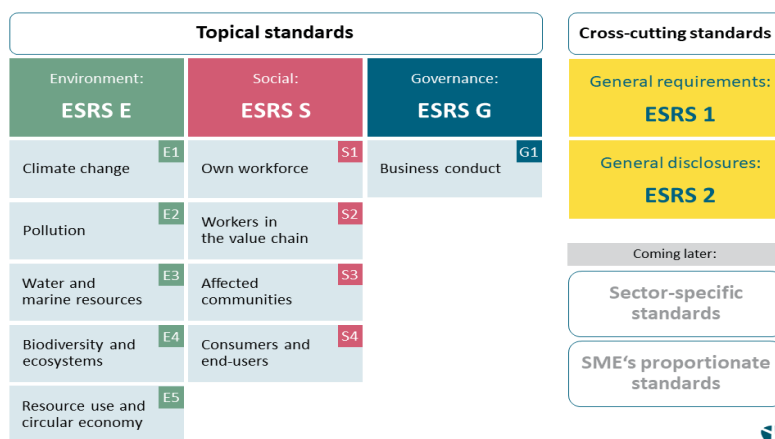
⁴⁴ IBM. (2023, September 15). *What is the CSRD*. Ibm.com.
<https://www.ibm.com/think/topics/csrd#citation1>

The crucial aspect of the CSRD regards the choice of one single standard framework to use for the draft of the non-financial report, thus in 2022 the European Financial Advisory Group (EFRAG) developed a first set of standards, the European Sustainability Reporting Standards (ESRS), that must be used when drafting the report, the next paragraph will explain the role of the EFRAG and in what the standards consist.

2.4 – The EFRAG

The previous paragraph explained how the CSRD works, without going into detail for what concerns the framework of sustainability reporting standards, the role assigned by European Commission to the European Financial Advisory Group (EFRAG). The EFRAG was established in 2001, encouraged by the EU Commission to fulfil the public interests in its activities. EFRAG activities can be divided in two sides, the first one is the financial reporting side, where it is involved in developing the IFRS standards from an European perspective; the second one regards the sustainability: in 2022, due to the CSRD, the entity continued its commitment toward the public interests by developing the European Sustainability Reporting Standards (ESRS) to be used by companies to draft the non-financial disclosure. The first set of twelve ESRS were formally adopted by the Commission in July 2023. The elaboration of those new standards complies with the main scope of the CSRD: ensure comparability, reliance and relevance of the ESG disclosure and the integration of double materiality. Figure 2 shows the twelve ESRS developed:

Figure 2: The first set of twelve ESRS



Note. Source: EY Denskatt

In order to develop the international reporting standards for the EU Directive, EFRAG cooperates with:

- The European Banking Authority
- The European Environment Agency
- The European Insurance and Occupational Pensions Authority
- The European Securities and Markets Authority⁴⁵

So, EFRAG developed the standards for the companies obliged to publish the non-financial disclosure but also simplified standards that may adopted by SMEs. This work was still demanded by the CSRD, and the advisory group split it in two workstreams: the development of simplified standards for listed SMEs , small banks and captive insurers (LSME) and a workstream dedicated to voluntary standards for SMEs not obliged to report (VSME), it's important to say that this last workstream is outside the scope of the CSRD⁴⁶.

The EFRAG while developing the international standards has planned, and is still planning, to adapt all the existing standards related to sustainability matters under a single framework, as the CSRD rules. Thus, the following paragraphs will delve into the explanation of the ESRS and then the other standards and then how EFRAG is working with them.

⁴⁵ IBM. (2023, September 15). *What is the CSRD*. Ibm.com. <https://www.ibm.com/think/topics/csrd#citation1>

⁴⁶ SMEs. (2022). EFRAG. <https://www.efrag.org/en/sustainability-reporting/esrs-workstreams/smes>

2.4.1 – The ESRS

The last paragraph presented the first set of ESRS published on July 2023 by the EFRAG, the are included in the “Sector Agnostic” standards, namely the ones that need to be implemented by all the companies using the double materiality perspective. The first standards are ESRS 1 *General Requirements*, it contains the mandatory principles for the disclosure of the sustainability statement in accordance with CSRD. It outlines how the report must be structured, including due diligence, value chain and time-related aspects and it also requires a materiality assessment for each standard. It highlights the relevance of the double materiality approach, and whether some topics are deemed not material, there must be a detailed justification⁴⁷.

Then the second standards are the ESRS 2 *General Disclosure* specifies policies, measures and objectives that must be reported within the outcome of the materiality assessment. In addition, ESRS 2 explains the structure and the content for the ESRS topical standards, identifying four disclosure areas:

- Governance
- Strategy
- Management of impacts, risk and opportunities
- Metrics and targets⁴⁸

These four areas of disclosure are in line with the TCFD/ISSB standards, the dedicated paragraphs of these two standards will explain them.

Then EFRAG has made other ten standards related to the ESG dimensions. From ESRS E1 to ESRS E5, they cover environmental topics: E1 on climate change, E2 on Pollution, E3 on water and marine resources, E4 on biodiversity and ecosystems and E5 on resource use and circular economy. For what concerns the E1, the standards ESRS 1 General requirement says that every company must disclose information about it, even if it may not be a material topic. This choice comes from the nature of the standards: climate change, it is directly linked with the objectives written in the Paris Agreement,

⁴⁷ *ESRS 1 GENERAL REQUIREMENTS*. (2023). European Commission.

⁴⁸ *ESRS 2 GENERAL DISCLOSURES*. (2023). European Commission.

that's why it's mandatory. The standards require companies to show environmental impacts and performances related on the business model shaped around more sustainable practises.

Following that, there are four standards addressed to social topics: ESRS S1 regards information on company's own force, S2 dedicated to employees in the value chain, S3 dedicated to communities affected by the company's activities and S4 covers consumers and user's rights. The S1 standards is mandatory as well, as reported by the General Requirements, and it's the only standard that requires quantitative information, while S2-S4 just requires qualitative information.

Last standard is ESRS G1, the only one committed to Governance field. The standard requires basic information on corporate policy and culture, furthermore it covers the roles of governance bodies, reporting on impacts, risks and opportunities, supplier relations and anti-corruption measures. Along with, E1 and S1 standards, even G1 is mandatory.

To conclude this set of standards, it's important to specify that any topic may have sub-topics⁴⁹.

The European Commission appointed the EFRAG to develop also "Sector Specific" standards, but the process has stopped since the European Commission eliminated the mandate, as reported in the Omnibus Package, the most recent update on the CSRD⁵⁰. The EU Commission stated that EFRAG has to focus only on the sector agnostic standards. At the moment, EFRAG paused the progresses made.

2.5 – GRI Standards

In the process of creation of the ESRS by the EFRAG different sustainability standards had already been created and used for the non-financial reporting. One of the most important frameworks is the Global Reporting Initiative (GRI), it is an independent international organization founded in 1997 with the mission of promoting transparency

⁴⁹ ESRS Set 1. (2023). Efrag.org. <https://xbrl.efrag.org/e-esrs/esrs-set1-2023.html#d1e10096-3-1>

⁵⁰ Sector-specific ESRS. (2022). EFRAG. <https://www.efrag.org/en/sustainability-reporting/esrs-workstreams/sectorspecific-esrs>

and accountability in sustainability reporting. Headquartered in Amsterdam, GRI provides a globally recognized framework that helps businesses, governments, and other organizations disclose their environmental, social, and governance (ESG) impacts in a consistent and comparable way. By setting universal standards for sustainability reporting, GRI aims to enhance stakeholder trust, support informed decision-making, and drive progress toward sustainable development.⁵¹ GRI creates standards for measuring companies impacts on environment, people and economy, there are three types of standards developed:

- Universal standards: they apply to all organizations.
- Sector standards: they address more consistent reporting on sector-specific impacts.
- Topic standards: they address relevant disclosure on a particular topic.

GRI remains one of the most used frameworks world-wide, being adopted across over 100 countries. These standards are regularly updated to align with UN objectives, like the SDGs. Moreover, GRI adopts a stakeholder-oriented approach, aiming to provide data and measures relevant to stakeholders, rather than investors. In contrast, the ESRS also integrates useful information for investors, given the financial materiality.

the first difference between GRI and ESRS regards the approach, GRI is based only on the impact materiality, namely the “inside-out approach”, or also named the single materiality approach, while the ESRS is based on the double materiality approach. Thus, since both ESRS and GRI produce standards for the impact materiality, there might be the overlapping issues, that’s why they keep cooperating and discussing since 2022. After three years of collaboration, EFRAG and GRI signed a memorandum in which the two organizations commit in aligning the frameworks. The first result of this cooperation was the publication of the “GRI-ESRS Interoperability Index”, available from the 30 of November 2023⁵². The tool indicates the relationship between the two frameworks, highlighting the homogeneity rate achieved. Organization that reports in accordance with ESRS will be considered as reporting “with reference” to GRI

⁵¹ Global Reporting Initiative. (2024). *About GRI*. [Www.globalreporting.org.
https://www.globalreporting.org/about-gri/](https://www.globalreporting.org/about-gri/)

⁵² *GRI-ESRS Interoperability Index*. (2023). GRI, EFRAG.

standards. Likewise, companies already using GRI standards can build on their existing disclosures to help meet the requirements of the ESRS Non-financial disclosure⁵³. A study published in the *Business and management Sciences International Review* in 2024 analyses the differences in applying the ESRS and the GRI standards. The study was conducted by Biancone, Chmet and Demarchi on the Gruppo Torinese Trasporti (GTT), an Italian intermodal public transport company⁵⁴. The study was carried out on the non-financial disclosure of 2020-2022, it emerged that GRI is more exhaustive than ESRS in these fields:

- Governance: GRI fulfils better in highlighting the role and performance of the board of directors.
- Better disclosure regarding the conflicts of interest.
- Better disclosure of measures of state aids, fiscality and pension benefits.

According to the paper, even if ESRS lacks in transparency, it is a step forward in the European standardization. To conclude, they suggest integrating the report with GRI standards just showed.

This growing alignment between GRI and ESRS enhances comparability and reduces the reporting burden for companies operating internationally, enabling a more consistent sustainability reporting.

2.6 – The IFRS and its sustainability standards

In the process of mapping the sustainability standards, the ISSB standards cover an important role. Those standards are made by the IFRS foundation, an independent, not-for-profit organization committed in the development of standards for companies. Since its creation in 2001, the foundation has developed the International Accounting Standards Board (IASB), one of the most used frameworks for accountability. Given the increasing need of the development of sustainability standards, in 2021 IFRS created the

⁵³ EFRAG. (2024). *Interoperability*. EFRAG. <https://www.efrag.org/en/sustainability-reporting/esrs-workstreams/interoperability>

⁵⁴ Biancone, P., Chmet, F., & Demarchi, L. (2024). Analyzing non-financial reporting through GRI-ESRS interoperability. *Business and Management Sciences International Review*, 15(2). <https://doi.org/10.13132/2038-5498/15.2.375-394>

International Sustainability Standards Board (ISSB), designed to provide sustainability disclosure to inform capital markets⁵⁵.

The ISSB has set four objectives:

- The development of standards that give a global baseline for the sustainability disclosure.
- To meet the information needed by investors
- To enable companies to provide fair and comprehensive information to global capital markets.
- To facilitate the interoperability with other disclosure that are mandatory for some jurisdiction.

The IFRS has just released two standards: IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information and IFRS S2 Climate-related Disclosure. While the S1 requires to the company only general requirements, the S2 requires to disclose information about its climate-related risk and opportunities⁵⁶. Both standards fully incorporate the Task Force on Climate-related Financial Disclosures (TCFD) recommendations. The standards show information whether the company is exposed to climate physical risks and/or climate transition risks. These two types of risks will be better discussed in the specific chapter.

From the explanation of the IFRS S2 emerges the nature of those standards, they focus on the RO assessment, which is the *Risk and Opportunities assessment*, which consist in the outside-in approach of the financial materiality. So, this is the main difference between ESRS and ISSB. In 2023, EFRAG and IFRS started to work on the interoperability of the standards, trying to reach a higher level of alignment and in May 2024 they published an Interoperability Guidance⁵⁷. In this report, the organizations cooperated in mapping the ESRS E1 *Climate Change* and IFRS S2, showing differences and alignment points. What emerges is the high level of interoperability, almost all the disclosure demanded by the IFRS S2 are covered or even superseded by ESRS E1.

⁵⁵ IFRS - International Sustainability Standards Board. (2021). [Www.ifrs.org. https://www.ifrs.org/groups/international-sustainability-standards-board/#about](https://www.ifrs.org/groups/international-sustainability-standards-board/#about)

⁵⁶ *Climate-related Disclosures IFRS S2 IFRS ® Sustainability Disclosure Standard International Sustainability Standards Board*. (2023). IFRS.

⁵⁷ *ESRS-ISSB Standards*. (2024). EFRAG, IFRS.

Since the IFRS standards are designed for the disclosure of environmental risks and opportunities, they are more investor oriented, thus they require mandatory disclosures for banks and financial intermediaries, contrary than EFRAG, that hasn't developed yet sectorial standards. With specific reference to the sector reporting, ISSB requires company to adopt the Industry-based guidance made by the SASB, another organization committed in the development of sustainability disclosures. Another difference regards the stakeholder engagement, it's heavily present in the ESRS disclosures, while ISSB do not cover them. In addition, ISSB doesn't disclose the same information about governance as EFRAG, the first is more committed on the risks and opportunities linked that may arise from governance bodies and behaviours, while the latter gives a broader view.

These are only a few divergences between the two organization, but they keep working together, aiming to increase the level of interoperability.

2.7 – What is “materiality”? how did it evolve?

Before starting to talk about the double materiality, namely the current method used by companies to understand which topic must be disclosed in the non-financial report, it's fundamental to give some basis about the base term of “materiality”.

This notion was originally used for financial statements, the Financial Accounting Standards Board (FASB) in 1980, through the Statement of Financial Accounting Concepts No. 2⁵⁸ defined it the extent of an accounting information omission or misstatement that, given the circumstances, makes it likely that the judgment of a reasonable person depending on the information would have been altered or influenced by mistakes. This means that initially, “material” was used to define a crucial topic of a financial statement without which the evaluation of a financial statement could have drastically change. Obviously, the word under discussion was only used for financial statement items because, at that time, the corporate culture believed only financial aspects as critical and sensitive, but later on, the concept was also embraced by sustainability reporting.

⁵⁸ *Statement of Financial Accounting Concepts No. 2 CON2 Status Page Qualitative Characteristics of Accounting Information.* (1980).

So, the importance of materiality was introduced in the sphere of non-financial reporting by the GRI organization, which in 2016 defined the materiality as topics that involves significant company's economic, social and environmental impacts, but also topics that influence stakeholders' decisions⁵⁹. Such definition was then rethought in 2021 by the same organization, becoming: topics that represent the company's most significant impacts on the economy, environment and people, including impacts on human rights. Although "impact materiality" was never mentioned neither in 2016, nor in 2021, this definition describe it properly, Since it was still assumed that only an entity could cause damage to society and the environment, it was understood that materiality was exclusively impact-related, and the GRI didn't imagine yet the concept of double materiality.

However, the introduction of "double materiality" occurred 2 years earlier, in 2019 due to European Commission's report called "Guidelines on Non-Financial Reporting: Supplement on Reporting Climate-Related Information"⁶⁰, guidelines developed to adjust the NFRD of 2014. The report encourages companies to implement materiality from two perspectives: climate-related information that change performance and development of a company should be reported; climate-related information provoked by the company that impact the environment and society. The first dimension of materiality is called "financial materiality", typically investors are interested on it, while the second one is called "environmental and social materiality", later known as impact materiality. This new perspective was then adopted also by the GRI in 2021, which released a report called "The double-materiality concept as a 'guiding principle' in the GRI Standards". Subsequently, it was also implemented by the European Commission through the CSRD in 2022, which led to double materiality becoming the only method for sustainable reporting.

To continue with the integration of the sustainability constituents into the sphere of materiality, the GRI organization with the paper "The Double-Materiality Concept: Application and Issues"⁶¹ provides an in-depth analysis of the concept of double

⁵⁹ *CONSOLIDATED SET OF GRI SUSTAINABILITY REPORTING STANDARDS 2016 2*. (2016). GRI.

⁶⁰ *Guidelines on non-financial reporting: Supplement on reporting climate-related information*. (2019). European Commission.

⁶¹ Adams, C., Alhamood, A., Wang, L., & Wang, Y. (2021). *The double-materiality concept Application and issues Invited contribution*. GRI.

materiality, formally introduced by the European Commission in 2019, highlighting both its potential and its practical challenges. The central thesis is that materiality had always been associated with financial aspects, like critical leverage, CAPEX, OPEX, EBITDA etc., but now materiality needs to be associated also to environmental and social matters, and the authors argue that from the analysis of the company's impacts may arise also financial risks and opportunities led to sustainability issues. In other words, impact materiality represents the necessary foundation on which financial materiality should be assessed, overturning the traditional perspective that tended to prioritize short-term economic relevance. From the perspective of benefits, the paper emphasizes that double materiality strengthens dialogue with stakeholders, encourages companies to consider their broader impacts on society and the environment, and supports the integration of the Sustainable Development Goals (SDGs) into strategic processes. Moreover, disclosure based on this approach is perceived as more relevant by investors as well, since it enables a better identification of long-term risks and opportunities. The development of the idea of materiality is a reflection of the increasing understanding that businesses function in a wider social and environmental framework. Both companies' financial performance and their external impacts must be assessed to understand a comprehensive picture of corporate responsibility and sustainability. Therefore, materiality is renewed: it includes the initial financial dimension plus the impact one. This integrated approach now represents the cornerstone of modern sustainability reporting frameworks, establishing a new standard for transparency, accountability, and long-term value creation.

2.8 – The IRO assessment

This section delves into the double materiality application according to compliance requested by the European Commission through the CSRD. The previous chapter has explained that the European Commission gave to the EFRAG the delicate task to explain how to evaluate Impacts and Risk & Opportunities. The paragraph will deeply dive into the guidance provided by the *EFRAG IG 1 – Materiality Assessment*⁶², the

⁶² EFRAG IG 1 Materiality Assessment. (2024). EFRAG.

latter fully explains how the undertaking should operate in order to perform a complete Impact and Risk-Opportunity Assessment (IROs assessment).

The instruction starts by saying that the process must perform four steps:

- 1) Context analysis
- 2) Identification of actual and potential impacts, risks and opportunities
- 3) Assessment and determination of material IROs
- 4) Reporting

The assessment must cover the entire value chain (instruction then deleted with omnibus package) and all the subsidiaries.

Starting from the context analysis, it is basically an understanding of the activities carried out by the company and also its business relationships. These two aspects are approached in terms of strategy developed, business plan, financial statements and other information provided to investors, in addition the company must map its products, services and activities, identifying where they are distributed and created. Lastly, the undertaking needs to map its up-stream and down-stream value-chain relationships. It's also important to include also legal aspects, like analysis of the regulatory landscape e existing sector-specific landmarks, scientific publications and sustainability trend. The context analysis continues with the stakeholder engagement, but this part will be discussed in a proper paragraph.

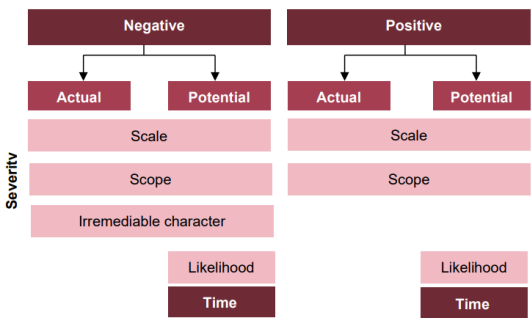
The identification of actual and potential impacts, risk and opportunities is the second stage, characterized by a long list of topics that can be material from the impact and/or financial side. The guidelines refer to the ESRS 1⁶³, a document that provides all the topics, sub-topics and sub-subtopics regarding ESG dimensions. It is possible that a specific topic is material from both sides, and sometimes this happens because impacts may also trigger risks and rarely even opportunities; other times the topic may be material from a single perspective. The EFRAG also warns to consider the materiality of these topics also in the value-chain, in addition it continues by also mentioning the time horizon for potential impacts, give the crucial role played by that variable. The

⁶³ ESRS Set 1. (2023). Efrag.org. <https://xbrl.efrag.org/e-esrs/esrs-set1-2023.html#d1e3467-3-1>

guidelines also suggest, when necessary, the integration of the GRI reporting topics, and with additional entity-specific information.

The assessment and determination of material IROs comes right after their identification. From now, the process is split in the inside-out approach (impact materiality) and the outside-in approach (financial materiality), because the undertaking needs to perform two different methodologies. The inside-out approach requires companies to define a quantitative and/or threshold to assess the materiality of actual or potential impacts. Before talking about the threshold, an impact is defined “actual” when it’s already occurred or it’s occurring at that moment, “potential” instead is used for possible future impacts. Obviously, impact can be negative and positive. The undertaking needs to assess the topic according to its severity, which can be decomposed in scale, scope and irremediable character. Scale means how grave is the impact; scope indicates how widespread is the impact and irremediable character refers to the extent to which the impact can be remediated. These three variables above described must be always used together when assessing a negative actual impact, while for positive actual impact only scale and scope are necessary. For potential positive impacts the undertaking needs to combine scope and scale with another variable: likelihood and time horizon; for potential negative impacts, the method is almost the same, company must combine scale, scope and irremediable character with likelihood and time. Figure 3 briefly shows which variable to use:

Figure 3: Assessing materiality of impacts.



Note. Source: PwC

The guidance continues that a topic can be considered material even if it overcomes a qualitative threshold, it can be for example an impact that involves critical features that must be assessed in this way even without a quantitative basis. To conclude, especially

for negative impacts, the text outlines the importance of the stakeholder engagement, involving stakeholders during the assessment it's crucial, since some information might be ignored by the undertaking, due to lack of information.

For what concerns the outside-in approach, the EFRAG asks companies to assess the risk and opportunities related to the same topics used for the impact materiality, using, again, quantitative and/or qualitative threshold. The threshold here is based on the magnitude of risks and opportunities on the company's financial performances, thus any possible change in the cash flow, profit, financial position, share value and so on. The assessment is based on the likelihood of occurrence and potential magnitude of financial effects on short-medium-long term. When applicable, the undertaking may compare the material risks and opportunities with those used in the risk management process (ERM), but only when the latter contains ESG-related ROs.

Then there is the reporting phase, the last one. Once a list of material IROs has been identified, the undertaking must:

- a) Describe the process of identification of those material IROs.
- b) Describe the relationship between those material topics and the business strategy, business model.
- c) Explanation of criteria used to identify threshold.

This is the entire process that the CSRD, through EFRAG, requires companies to perform.

2.8.1 – The significance of integrating the two perspectives

This sub-section aims to demonstrate the importance of double materiality. The convenience of this new approach and its enhancements are seen from different points of view. Scholars, standard setters, and consulting firms have analysed the potential of DM not only as a compliance obligation but also as a strategic tool that can enhance transparency, strengthen governance, and improve long-term resilience. The following discussion outlines the main advantages of adopting a double materiality approach, drawing on evidence from academic literature, international organizations, and industry reports.

The first advantage regards the broader view provided by the double materiality (DM), as highlighted by Nielsen, C. (2023)⁶⁴ who made a study on the opportunity given by this approach to develop useful KPIs to improve the business model. The author conducted a case study on an important Danish port called Port Esbjerg, analysing its value chain, due diligence and business model. It's important to say that the materiality assessment was conducted by the authors itself, who collected company's reports, made different interviews, and then he identified 10 material topics, then divided in material impacts and material risk and opportunities. What emerged is DM can be seen as a bridge to create relevant KPIs to improve business model, he demonstrates that even within a so complicated sector, the IROs assessment is a strategic tool and not only a mere compliance. He also highlighted the necessity to provide additional instruments to enforce the process, like a KPIs database, but also a guidance to select the materiality threshold. This article points the attention to the strategic relevance of this approach.

Moreover, additional insights are provided by S&P Global, an important organization that offers financial information, analytics and benchmarking. According to S&P Global Sustainable⁶⁵, the adoption of a double materiality perspective offers several key advantages for corporate reporting and strategic management. By combining financial materiality with impact materiality, it provides a complete and more transparent picture than single materiality approaches. This dual lens makes disclosures more useful to a broader range of stakeholders, not only investors, but also regulators, employees, customers, and civil society, by capturing both risks and opportunities across financial, environmental, and social dimensions. Double materiality also enhances risk identification, particularly regarding transition, regulatory, and reputational risks, while simultaneously highlighting opportunities for innovation and long-term value creation. In addition, it strengthens alignment with emerging regulations such as the EU's Corporate Sustainability Reporting Directive (CSRD) and the European Sustainability Reporting Standards (ESRS), supporting compliance and reducing non-conformance risks. Beyond reporting, S&P emphasizes that double materiality can drive corporate

⁶⁴ Nielsen, C. (2023). ESG Reporting and Metrics: From Double Materiality to Key Performance Indicators. *Sustainability*, 15(24), 16844. <https://doi.org/10.3390/su152416844>

⁶⁵ Van der Lugt, C., Andérez, M., & MacFarland, M. (2025). *The state of double materiality in corporate reporting*. S&P Global. <https://www.spglobal.com/sustainable1/en/insights/special-editorial/double-materiality-is-gaining-traction-in-corporate-reporting>

strategy, governance, and resilience by embedding sustainability considerations into long-term decision-making. Finally, as methodologies converge, disclosures based on double materiality are becoming more comparable and credible, improving their utility for analysts and investors and reinforcing trust in ESG reporting.

Furthermore, even consulting firms contributed to the existing literature, for example BCG, through its report called *The New Materiality Assessment (2023)* ⁶⁶ argues that adopting a double materiality approach brings clear advantages for companies navigating the ESG landscape. It enables organizations to identify both financial risks and opportunities as well as broader social and environmental impacts, producing a more comprehensive and reliable basis for sustainability reporting. By categorizing ESG topics into three groups “differentiators” (issues to proactively focus on because they can strengthen strategic positioning and competitive advantage), “enablers” (topics that support broader business transformation and innovation), and “areas to monitor” (baseline compliance topics that must be addressed but do not drive strategic differentiation), companies can better align disclosures with business strategy, sharpen priorities, and allocate resources more effectively. The approach also strengthens compliance with the EU’s CSRD and the ESRS standards, while at the same time giving companies the opportunity to shape evolving regulatory practice through their own methodologies. However, BCG also points to challenges: current regulation lacks detailed aggregation rules and thresholds, leaving firms with significant discretion, and potential inconsistency, in defining scoring methods. In addition, companies may face uncertainty on how to balance input from different stakeholder groups, and how to avoid compliance becoming a burdensome exercise. In short, while double materiality provides a powerful tool for transparency, strategy, and resilience, it also raises practical complexities that require careful design and governance to implement effectively.

To conclude, the adoption of a double materiality approach clearly emerges as more than a regulatory requirement; it is a strategic enabler for companies aiming to integrate sustainability into their core business model. The evidence from academic research, international standard setters, and consulting firms consistently highlights its capacity to

⁶⁶ Fantini, L., Leiendecker, J., & Testino, B. (2023). *The New Double Materiality Assessment A Toolbox for Companies*. BCG.

generate more comprehensive disclosures, foster stakeholder trust, and strengthen long-term resilience. At the same time, the practical challenges associated with defining thresholds, engaging diverse stakeholders, and ensuring methodological consistency indicate that its implementation still requires careful refinement. Nevertheless, as frameworks and practices continue to evolve, double materiality holds the potential to become a cornerstone of corporate sustainability, bridging compliance with innovation and aligning financial performance with societal and environmental responsibility.

2.9 –Stakeholder engagement

This paragraph is dedicated specifically to stakeholder engagement during the IROs assessment, given its central role in shaping the final disclosure and ensuring the process is transparent, inclusive, and robust. Stakeholder engagement, in this context, is not merely a procedural step but a strategic activity aimed at gathering valuable insights, perspectives, and expectations from those who are directly or indirectly affected by the organization’s activities. As highlighted in the context analysis described in the previous section, involving stakeholders is essential to identify and understand which actors, communities, and interest groups are linked to the business’ operations, as well as to assess their level of influence and the potential impacts they may experience. Through this process, the organization can better define priorities, align its assessment with real-world concerns, and enhance the credibility and relevance of the final outcomes.

*The EFRAG IG 1 – Materiality Assessment*⁶⁷ also includes a specific paragraph dedicated to stakeholders, this category can be divided in two groups: users and affected stakeholders.

Users are stakeholders not directly hurt by the companies’ activities, individuals or organizations that rely on the company’s sustainability reports to make decisions. They typically include investors, lenders, and other providers of financial capital, but can also cover regulators, analysts, or other interested parties seeking to evaluate the company’s performance or risks. Affected stakeholders consist in people, groups, or entities whose

⁶⁷ EFRAG IG 1 Materiality Assessment. (2024). EFRAG.

lives, rights, or environments may be influenced, either positively or negatively, by the organization's activities or its business relationships. This influence can be direct or indirect, immediate or long-term.

The ESRS 2⁶⁸ calls for transparency for the undertaking's consultation with stakeholders, in fact the EFRAG, as specified in the previous chapter, asks companies to involve them and to demonstrate this cooperation. When the company starts identifying all actual and potential impacts and also risks and opportunities, it's useful to engage a regular dialogue with different stakeholders involved, so the EFRAG suggests building a stakeholder map, spotting the most significant ones, and when possible, prioritising them. Even in the next phase, the assessment and determination of material items, stakeholders may be involved, especially for particular severe negative impacts. When the engagement is not possible, the company may consider the consultation of NGOs, credible independent experts and scientific articles.

Involving stakeholders has always raised several concerns given all the implication, even before the establishment of the mandatory non-financial disclosure, including stakeholders in the decision process or during risk and opportunity assessment might be a key decision to understand the context. Focusing on the stakeholder consultation in sustainable reporting, from the literature emerges different aspects, regarding usefulness, limits but also methods to develop for a better involvement and reliable results. The following findings come from reports complaint with previous European norms (NFRD) or voluntary non-financial reporting.

The first paper analysed concerns the modalities of engagement, and the literature behind this topic comes earlier than the involvement only for sustainability assessment, rather they come with the "stakeholder theory", which holds that a company should take into account, within its decision-making processes, all groups and individuals who are involved in its activities or who have a legitimate interest in them⁶⁹. Thus, the paper published by Giacomini, D., Rocca, L., & Tonoli, D. (2025)⁷⁰ discuss about the

⁶⁸ *ESRS 2 General Disclosure*. (2023). EFRAG.

⁶⁹ Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of management Review*, 20(1), 65-91.

⁷⁰ Giacomini, D., Rocca, L., & Tonoli, D. (2025). Exploring Materiality and Stakeholder Engagement in European Water Utilities' Sustainability Strategies, Organizational Practices, and Reporting. *Business Strategy and the Environment*, 34(2), 2607-2629.

importance of the stakeholder engagement, a core part of the stakeholder theory, by analysing its role in the non-financial reporting. The study confronted the stakeholder participation in 26 European water utilities companies from 2020 to 2022. They identified four different interaction modalities with stakeholders:

- 1) Informing approach: firms opting for one-sided communication without asking feedback (for example with a mere communication via website).
- 2) Responding approach: two-way communication, however the decision is always taken by the company, stakeholders just send feedback and opinions.
- 3) Involving approach: establishing a real dialog between company and stakeholders, where the latter's influence grow.
- 4) Collaboration: where stakeholders intervene in the decision process, providing knowledge and participating actively.

They found that the majority of enterprises use the informing and responding approach, the last two modalities are related only to specific projects with high institutional pressures. It emerged that the collaboration and the involving approach required more time and effort, and companies preferred to adopt softer measures, at the same time they do not let stakeholder participate actively in the decision process, fearing a loss of decision power. Lastly, the case of collaboration and involvement emerged only when the company really trusted specific stakeholders, perceiving them as “strategical” and “competent”.

This study was conducted during years where CSRD still didn't exist, and it already highlighted the first critical aspects: fear of loss of decision power and lack of tools to implement a correct engagement. From 2025, EU enterprises experienced the EFRAG guidelines, which are expected to address these weaknesses by introducing a more structured framework, standardized methodologies, and clearer requirements for documenting and demonstrating stakeholder involvement. This shift marks a transition from voluntary and fragmented practices towards a mandatory, comparable, and more transparent process, aiming to strengthen both the reliability of disclosures and the trust of stakeholders.

2.10 – Positive approaches versus challenges and critical reflections

To conclude the chapter dedicated to double materiality, this last paragraph shows the state of art of this approach both from companies which have already implemented it, both from other ones that have never done it before, to understand what the challenges are but also the achievements collected by companies.

Starting from a case study, Bartolacci, F., Del Gobbo, R., & Soverchia, M. (2025)⁷¹ compared two big Italian family business firms to understand the application of double materiality approach. They initially conducted interviews to the two companies' directors, then checked the outcomes of the sustainability statements, the first company analysed was called "Alpha", the second one "Beta". The findings of this study show that the family businesses analysed have already demonstrated significant attention to sustainability reporting, either by initiating the drafting of their first sustainability report (Alpha) or by publishing such reports for several years (Beta), with the latter already aligned with the double materiality principle. Both companies possess the technical resources and expertise to manage the reporting process, yet their approach reveals an asymmetry: financial materiality is more readily understood and adopted than impact materiality. While the CSRD emphasizes impacts as the starting point, these firms tend to prioritize risks and opportunities for the company itself rather than the effects on the environment and society. The discussion highlights that this imbalance is not primarily a technical issue but rather a cultural and mental one. Through the lens of agency theory, family businesses can be seen as "agents," focusing on financial performance and wealth generation, which explains their emphasis on financial materiality. Conversely, stewardship theory suggests that firms acting as "stewards" of stakeholder interests would give greater attention to impact materiality, stakeholder engagement, and the integration of sustainability into strategy. The evolution from an agent to a steward role thus represents a critical shift, associated with broader organizational identity and leadership orientation. Evidence from the cases suggests that second-generation family members tend to be more sensitive to social and environmental sustainability issues, moving the firm toward a more collective and long-term perspective, aligned with an extended socioemotional wealth approach. In conclusion,

⁷¹ Bartolacci, F., Del Gobbo, R., & Soverchia, M. (2025). How are family businesses approaching the double materiality principle? A multiple case study. *Management Decision*.

the real challenge for family businesses lies less in their technical preparedness and more in adopting a mindset that equally values financial and impact materiality. Early adopters play a crucial role in institutionalizing new practices, but a gradual cultural shift is necessary for the full realization of double materiality.

In addition to the case studies, surveys were also conducted, including a PwC survey⁷² published in June 2024 on companies both within and outside the European Union. The survey was conducted on a sample of companies that will be required to publish sustainability reports in 2025 and others in 2026 according to the CSRD. The results showed that despite a good confidence in sustainability reporting, less than half of the sample have completed key activities, focusing on double materiality, only 33% of the respondents were able to conduct the assessment, 47% of them are in progress to complete, while 17% stated that have planned but not started this process. Furthermore, with the implementation of materiality threshold, the number of IROs decreased, before the EFRAG compliance, companies used to disclose approximately 100 IROs, after the compliance the number changed, the range was 20-50 topics. At the same time, 57% of the respondent identified obstacles in defining the perimeter of action, others stated difficulties in data collection for certain ESRS.

Taking into account *The state of double materiality in corporate reporting*⁷³ the report previously mentioned, it also provides some insights on the perception of this process. The investigation was conducted on a sample of 4.551 enterprises' sustainability statement. It emerged that only 48% used the actual double materiality approach, and among these fractions, 67% publish their materiality assessment process, including details on threshold, stakeholders and material topics. in this analysis too, companies tended to prioritize risk and opportunities over impacts, the most frequent risks assessed material were “climate Transition & Physical risks” (35%). Again, the selected firms found difficulties in giving a score to certain impacts, especially for the “irremediable character“ , it came up that about 46% of the respondent succeed in giving quantitative

⁷² PricewaterhouseCoopers. (2024). *Global CSRD Survey 2024* | PwC. PwC. <https://www.pwc.com/gx/en/issues/esg/global-csrd-survey.html>

⁷³ Van der Lugt, C., Andérez, M., & MacFarland, M. (2025). *The state of double materiality in corporate reporting*. S&P Global. <https://www.spglobal.com/sustainable1/en/insights/special-editorial/double-materiality-is-gaining-traction-in-corporate-reporting>

information regarding impacts on environment and society, the rest of the sample failed in the quantification of some impacts, giving only a qualitative description.

Overall, the evidence shows that the implementation of the double materiality approach is still at an early and uneven stage. While many companies have started the process and show a growing awareness of its relevance, they remain more oriented toward financial materiality, with impact materiality often perceived as more complex and less immediate. This gap doesn't exclusively come from technical barriers, such as data collection or methodological difficulties, but reflects a deeper cultural and organizational challenge. The successful institutionalization of double materiality therefore depends on a gradual shift in corporate mindset, where firms move beyond compliance and integrate social and environmental impacts into their strategic vision. Early adopters and second-generation leadership within family businesses seem to play a key role in driving this transition, highlighting the importance of stewardship-oriented governance models. Ultimately, achieving a balanced and mature application of double materiality requires not only technical refinement, but also an evolution in values, priorities, and leadership approaches across the corporate landscape.

Chapter III - Beyond the Sustainability Report: Climate Risks and Corporate Transparency

This chapter distances itself from the previous ones, focused on the functioning of the non-financial report and the double materiality assessment but also on their strength, especially chapter I and II give lots of details on the new disclosure required by the CSRD. Although all the pros seem to describe a more complete and consistent reporting, the present chapter aims to examine two grey areas of the sustainable reporting. So, the scope of this unit is to find potential lacks of this directive, in order to have a broader view of the theme.

The first grey zone regards two emerging climate-change risks not well included by EFRAG guidelines; they are the transition and physical risks. Although EFRAG provides information about the identification of ESG risks, it doesn't tell anything about its quantification, so the first part of the chapter makes a first analysis on the ESRS E1

Climate Change provisions and then delves into climate risk assessment. There is a first analysis made on the *Wave 1* obliged to report according to CSRD, analysing how they managed those risks, then a literature review of the climate scenarios and ESG risk assessment frameworks.

The second criticism concerns the legal provisions of the CSRD regarding three themes: protection of trade secrets versus transparency requirement, sanctions and liabilities.

The main concern is the debate between trade secrets protection and transparency, which leads to a room of interpretation, while sanctions and liabilities provisions are clear, but they may lead to opportunistic behaviours. This second part is analysed according to Italian norms that transposed the EU Directive.

The chapter ends with the explication of the Omnibus Package, the 2025 EU reform that aims to reduce the scope of the CSDDD and CSRD in order to facilitate companies' disclosures and efforts. This package came after a lot of complains from different stakeholders, however among them they do not share the same point of view.

3.1 – New climate-related risks: from the birth to the current treatment

The first paragraph provides the milestones from which physical and transition risks are born, preceded by a first description of these risks. These climate-related risks, as well as the non-financial disclosure, are quite new, and their meanings have changed over time.

Starting from the actual definition, transition and physical risks are both related to the negative impact that climate change may cause on companies, the European Central Bank gives a clear definition of these two risks with the *Guide on climate-related and environmental risks*⁷⁴:

- Physical risk describes the financial consequences of climate change, which include both the growing occurrence of extreme weather events and slower, long-term shifts in climate, as well as environmental damage such as pollution

⁷⁴ *Guide on climate-related and environmental risks*. (2020). European Central Bank.

of air, land and water, scarcity of water resources, biodiversity decline, and deforestation.

- Transition risk refers to the potential financial losses that a company may face, either directly or indirectly, as the economy shifts toward a lower-carbon and more sustainable model. Such risks can arise, for instance, from the sudden introduction of climate or environmental regulations, rapid technological developments, or shifts in market dynamics and consumer preferences.

These two risks derive from the direct consequences of climate change, but their first appearance occurred in 2015, during the Mark Carney speech⁷⁵, at that time the Bank of England governor expressed multiple concerns regarding those risks. Basically, he said that climate change would cause catastrophic effects in the future that will also affect the size of businesses and financial institutions. He went on to say that these concerns are confirmed by scientific evidence. He highlighted three climate risks: physical risk, transition risk and a third called legal liability risk, which refers to possible lawsuits against companies responsible for emissions.

He defined the physical risk as “the impacts today on insurance liabilities and the value of financial assets that arise from climate- and weather-related events, such as floods and storms that damage property or disrupt trade”, while transition risk as “the financial risks which could result from the process of adjustment towards a lower-carbon economy. Changes in policy, technology and physical risks could prompt a reassessment of the value of a large range of assets as costs and opportunities become apparent.” He suggested that companies should act quickly to limit those risks in addition he said that companies should disclose their carbon intensity measures plus a climate stress test to value their performance. Lastly, he argued that it’s not banks duty to guide the transition, but banks should provide precise metrics on these risks, so he proposed to implement a task force on Climate for climate disclosure, two years later called TCFD⁷⁶ (Task Force on Climate-related Financial Disclosures).

⁷⁵ Carney, M. (2015). Breaking the tragedy of the horizon—climate change and financial stability. Speech given at Lloyd’s of London, 29, 220-230.

⁷⁶ *Recommendations of the Task Force on Climate-related Financial Disclosures - Final Report*. (2017). Financial Stability Board.

So, this resulted in the creation of a new task force, from the impulse of Carney's speech, the Financial Stability Board (FSB) in 2017 created this framework in order to have transparent, comparable and consistent information of climate-related risks. The TCFD⁷⁷ was then updated in 2021, it proposes a voluntary disclosure based on four pillars:

- 1) Governance: how directors and committees manage and oversee climate-related financial risks and opportunities.
- 2) Strategy: it suggests using a climate scenario analysis to simulate the company strength and resilience over those risks, assessing actual impacts on the business and valuing potential risks and opportunities in the short-medium-long term.
- 3) Risks management: implementation of processes to identify, value and manage risks plus the integration of the latter inside the ERM.
- 4) Creation of measures for risks and opportunities, including mandatory data for emission scope 1, 2 and 3. In addition, it requires the creation of reduction emission targets.

The framework moves around this process, and it was then adopted by the EBA (European Bank Authority) and in July 2023 the ISSB took control over this framework, and nowadays it still manages its evolution. Even the EFRAG partially adopted the TCFD framework, but this partial effort led to some grey zones, (that will be explained in chapter 4.3) given that, European companies compliant with CSRD will find some difficulties and doubts in the disclosure of such information.

3.2 – Physical and transition risks features

The previous section introduced the current definition of physical and transition risks, this section here, describes them more in depth, showing their interconnection with other kind of risks.

⁷⁷ Task Force on Climate-related Financial Disclosures - *Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures*. (2021). Financial Stability Board.

Taking again the European Central Bank definition⁷⁸, physical risk is associated with negative climate events that may hurt company's product, services, assets and business units, creating a financial loss. This risk can be:

- Acute: when it derives from extreme weather events due to their repetitive frequency or due to their severity, like droughts, floods and storms.
- Chronic: it derives from progressive long-term shifts in climate patterns that will cause permanent changes for example biodiversity loss, sea-level rises or increasing temperature.

Physical risk may result in a damage to properties or facility or to subsequent events like disruption of supply chains, but also reductions in revenues due to decreased production capacity, or due to higher costs.

Shifting toward transition risk, it's the economic loss that a company may face due to the adaptation to a lower carbon-emitting business. The U.S. Environment Protection Agency (EPA)⁷⁹ gives more details about this adaptation, it specifies that the risk can be decomposed in four categories: policy and legal, technology, market and reputational.

- Policy and Legal: risk associated to a new policy built around climate change, generally they can be policies aimed to limit actions that contribute the increase of global warming; policies that seek to promote adaptation to climate change. The financial effects and overall risks linked to policy changes vary according to both their type and when they are introduced. As the costs of climate-related losses and damages continue to rise, the likelihood of litigation is also expected to grow. Such legal actions may stem from organizations not adequately reducing their climate impacts, not adapting to changing conditions, or not providing sufficient transparency about significant financial risks.
- Technology: new innovation or improvements that enable the use of cleaner technologies may displace the older ones, forcing those companies using older technologies to make new investments.

⁷⁸ *Guide on climate-related and environmental risks*. (2020). European Central Bank.

⁷⁹ *Climate Risks and Opportunities Defined*. (2022, November 28). [Www.epa.gov](https://www.epa.gov/climateleadership/climate-risks-and-opportunities-defined); US EPA. <https://www.epa.gov/climateleadership/climate-risks-and-opportunities-defined>

- Market: changes determined by climate-change in the demand and/or supply of certain commodities, products and services may hurt company's revenues and cash flow.
- Reputation: Climate change is recognized as a possible driver of reputational risk, linked to how customers and communities perceive an organization's role in either supporting or hindering the shift toward a low-carbon economy.

These two environmental risks can be connected with other existing risks, they can trigger credit, operational, liquidity and market risks, as highlighted by the Basel Committee on Banking Supervision (2021)⁸⁰. The report argues that physical and transition risks are not a new autonomous category, yet they exist and influence traditional risks through microeconomic and macroeconomic channels. At the micro level, physical and transition risk drivers affect banks directly through their counterparties, assets and operations, influencing credit quality, asset valuations, liquidity needs and operational continuity. At the macro level, climate risks shape broader economic and market conditions, such as growth, inflation, sovereign risk and financial market volatility, which in turn feed back into banks' traditional risk categories. Making a distinction for each type of traditional risk, here's how climate risk may affect them:

- Credit risk: Climate risks affect companies' capacity to repay loans and the value of collateral. Physical risks, such as floods or wildfires, can destroy assets, reduce incomes and decrease profitability, thereby increasing defaults. Transition risks, like new carbon taxes or stricter regulations, can erode the business models of carbon-intensive companies.
- Market risk: Financial instruments may suddenly repricing due to transitional of physical concerns. Extreme weather events may increase market volatility, while policy changes or technological shifts can devalue equities and bonds of affected industries (e.g. fossil fuels, utilities, transport). These shocks undermine risk management assumptions, such as asset correlations and liquidity.

⁸⁰ *Climate-related risk drivers and their transmission channels*. (2021). Basel Committee on Banking Supervision.

- Liquidity risk: Following climate-related shocks, firms may face difficulties in meeting urgent payment obligations.
- Operational risk: Companies' own operations are directly vulnerable to climate hazards. Severe storms, heatwaves or floods can disrupt branches, data centres or communication systems, while prolonged climate litigation and regulatory scrutiny can generate additional legal and compliance costs. Moreover, financing activities perceived as environmentally harmful can expose companies to reputational damages, further intensifying operational risk.

This paragraph details the climate-related risks, showing also their link with the traditional risks. It emerges a strong link, where physical and transition risks never stand alone, instead they are attached to one, or even more than one of the four common risks. The chapter then continues with the EFRAG provision over these two risks.

3.3 – The EFRAG provision over climate-related risks

How physical and transition risks are recognized by the EFRAG? The European association too, took inspiration from the TCFD. But there are some possible adjustments to fill the gaps.

The ESRS E1 *Climate Change*⁸¹ gives some information about physical and transition risks, the undertaking should, for each material climate-risk identified, define whether it is physical or transition risk. Moreover, how defined by the TCFD, the company shall describe the resilience of its business model and strategy in relation to physical and transition risks, assessing on how the resilience analysis was conducted, the use of climate scenario analysis, concluding with the disclosure of the result.

For climate-related physical risks, the standard asks companies to identify climate-related hazards, considering at least high emission climate scenarios; and to assess how its assets and business activities may be exposed or are sensitive to these hazards, so that the undertaking can create a gross physical risk. This process must be performed for companies' operations and along the value chain. Regarding climate-related transition

⁸¹ *ESRS E1 CLIMATE CHANGE*. (2023). EFRAG.

risks, the process is quite the same, the difference stays in the fact that the guidelines ask companies to find both risks and opportunities, specifically identifying climate-related transition events while taking into account a climate scenario that at least align with keeping global warming to 1.5°, either with or without minimal overshooting. To conclude, companies should explain how scenario-analysis works, including a range of possible scenarios.

Continuing, after the scenario analysis, companies shall disclose the expected financial effects from material physical and transition risks, and potential expected benefits from climate-related opportunities. The expected financial impacts of material physical and transition risks aim to give insight into how these risks may, or are likely to, substantially affect the company's financial standing, operating results, and cash flows in the short, medium, and long term.

For both material risks identified, the undertaking must communicate different information:

- For physical risk: monetary amount and proportion of asset exposed to physical risks, identifying whether they are acute or chronic, over short, medium and long term. Proportion of assets at risk covered by climate adaptation measures. Geographical location of assets at risk, and amount and proportion of net revenues derived from activities at physical risk.
- For transition risk: amount and proportion of assets at transition risk, before mitigation actions, plus proportion of assets at risk covered by mitigation actions. Book value of properties broken down by energy efficiency class. Potential liabilities to be recorded in future financial statements. Amount and proportion of net revenues from transition risks activities and an estimation of stranded assets up to 2030 and from 2030 to 2050.

This is what EFRAG requires to perform according to ESRS E1, however inside the guidelines there is no standardized methodology to measures the financial effects caused by the two risks. Thus, the company needs to adopt internal methodology, explaining the assumptions, limits and used parameters. And here emerges the gap of ESRS provisions: it asks to identify the two environmental risks but doesn't mention how to assess them, this situation leads to inconsistencies, because companies may adopt

different valuation models, translating into lack of coherence and consistence among sustainability disclosures.

3.4 – Critics and limitation of the EFRAG’s climate risks provisions

Continuing with the EFRAG provisions on climate-related risks, several critiques have emerged. This section examines both large companies that voluntarily adopted the double materiality approach, publishing a sustainability statement before the mandatory compliance, and large companies required to disclose a sustainability statement under the CSRD provisions, meaning the first enterprises that published in 2025 a sustainability statement for the financial year 2024.

Starting from companies that voluntary drafted a sustainability statement using the double materiality principles defined by the CSRD, Panfilo S. et al. (2024)⁸² conducted a study on a sample of companies listed on the STOXX Europe 600 index. The paper aims to discover whether the double materiality actually influences the transition and physical risks management. The study reveals that company size has a positive effect on the number of ESG risks, meaning that the bigger it is, the larger is the number of ESG risks. Another insight regards companies that already faces a large number of systemic risks, these firms tend to be more prepared in facing the new climate-related risks, however these companies didn’t seem to be benefited by the double materiality approach, the authors say that given their experience in risks management, they are already well-prepared. Lastly, the paper highlights that early adopters delay in performing the ESG risk assessment compared to the impact assessment, the authors suggest that this difference may be explained by the lack of preparation on a scenario analysis, but also a lack in terms of organization. They think that the full integration of the risk assessment will take time to unprepared companies, in addition, companies need to promote a greater integration of sustainability-related risks into corporate governance, strategy and risk management, and this will require significant reform.

⁸² Panfilo, S., Scarpa, F., & Canestraro, N. (2025). Reporting for change: does the adoption of double materiality influence ESG risk management? *Management Decision*. <https://doi.org/10.1108/md-10-2024-2436>

Shifting to the considerations carried out for the latest published sustainability statements, consultancy firms released their first comments on those works. EY released in April 2025 the “EY CSRD Barometer 2025”⁸³ a deep *survey-based* analysis conducted on the first sustainability statements compliant with CSRD. The study investigates the level of readiness, disclosure and quality of sustainability information provided by companies that are either obliged or voluntary compliant. In the first year of CSRD implementation, several shortcomings emerge in how companies address physical and transition risks. A large majority rely on phase-in options, with most omitting disclosures on the anticipated financial effects of climate-related physical and transition risks. While nearly four out of five companies report having a climate transition plan, these disclosures are often incomplete, lacking alignment with the Paris Agreement’s 1.5°C target or a clear assessment of financial implications. Heterogeneity in base years and target horizons further undermines comparability, as firms set widely divergent starting points and net-zero commitments clustered between 2040 and 2050. Moreover, the reporting style is frequently compliance-driven, prioritizing technical alignment with ESRS requirements over a transparent articulation of risk impacts on business models. Finally, sectoral disparities persist, with infrastructure companies comparatively advanced in transition planning and services lagging far behind. These gaps highlight that while disclosure frameworks are now in place, the substantive management of climate-related risks remains fragmented and immature, limiting the capacity of stakeholders to assess companies’ real exposure and resilience.

One month later, EY conducted an *evidence-based* study⁸⁴ conducted on 137 sustainability report published by the *wave 1* companies, i.e. the ones obliged to disclose the report according to the CSRD. Here the consultancy firm directly analysed the quantitative and qualitative information provided. It emerges that almost all firms have conducted a physical (100%) and transition (96%) climate risk analysis, but there are several difficulties in comparing different results, meaning that the way quantitative data are disclosed isn’t well aligned among companies. Companies tend to rely on qualitative descriptions and scenario analyses without clearly linking these risks to

⁸³ *EY CSRD Barometer 2025 Setting the baseline: a first-time application analysis of CSRD-compliant sustainability statements*. (2025). EY.

⁸⁴ *Key insights from CSRD reports*. (2025). EY.

financial impacts, frequently postponing disclosures on anticipated financial effects by using phase-in provisions. Another weak spot is financial planning: just 26% of companies provide forward-looking Capex and Opex for their full transition plans, and funding explanations are often generic.

Furthermore, the EFRAG too made a research on the *wave 1* sustainability statement published called *State of Play 2025*⁸⁵. This research aimed to observe how these companies implemented the ESRS, collecting doubts and best practised used and then providing insights on how to manage possible issues. To perform this study, the EFRAG collected 656 disclosures. Different lacks emerged concerning the management of transition and physical risks, starting from the firsts, 55% of the responding firms declared to have transition plans for climate change, but only a few were detailed and standardized, many of them covered only Scope 1 and 2 emissions and less than 40% included Scope 3. For what concerns physical risks, many companies address them only at a narrative level, but pioneering cases are emerging where financial effects are quantified, the problem here is how to quantify them.

Given all these issues, companies are still struggling with the treatment of ESG risks, even before the actual compliance that started in 2025, the most of them weren't able to conduct a proper analysis. It results that from *Wave 1* companies, a large fraction exploited the phase-in option omitting disclosures on the anticipated financial effects of climate-related physical and transition risks. This shows that the main weakness lies not in the reporting framework itself, but in companies' limited ability to integrate climate risks into financial and strategic planning. Disclosures remain largely qualitative and fragmented, with little evidence of genuine risk management. Unless firms develop stronger analytical and governance capacities, the EFRAG framework risks remaining a formal exercise rather than a real driver of resilience and sustainable transition.

3.5 – Climate risks valuation and scenarios

The previous sections described EFRAG's provisions related to the climate risks management into the sustainability statement. Since the ESRS describes the two risks

⁸⁵ *State of Play 2025*. (2025). EFRAG.

without saying how companies must measure their financial effects, this part will explore possible existing models. Over the years, different associations and institutions developed tools and frameworks to measure climate risks, in order to provide to investors and financial operators a clear view of them. So, this paragraph announces existing tools that can be implemented in financial contexts, rather than corporate ones. Before starting, it's important to separate institutional framework, used to help investors in spotting and valuating climate risks; and scenarios, aimed to show to economic and financial models influenced by different climate plots.

3.5.1 – Institutional investors' frameworks

This sub-section explores three possible ways in which institutional investors can integrate climate risks into their investment strategies. Three models will be described, the first one relates to valuation of financial effects of transition risks, the other ones concern the valuation of physical risks; the first two models regard infrastructure investments, the third one concerns investments made by asset owners.

The first model is the *Climate Transition Risk Framework*⁸⁶, it was created in 2018 by the Climate Wise Insurance Advisory Council a global network composed by insurance companies that wants to contribute to reduce the climate impact produced by this sector. The framework is based on the TCFD recommendations, and it aims to help investors to understand the extent to which transition risks can affect the performance of infrastructure investment portfolios. It demonstrates a transparent, adaptable and robust methodology for assessing the financial implications of a low-carbon transition on the performance of infrastructure investments over relevant time periods. The framework consists in three phases, each one can be implemented alone, but the full-integrated implementation allows the investor to understand better the risks.

- 1) Exposure to portfolio risks and opportunities: it permits investors to identify the material financial impacts arising from transition risks, by applying the infrastructure Risk Exposure Matrix. This tool is used to value the exposure to transition risks across a wide range of asset classes, geographic areas, climate

⁸⁶ *Transition risk framework Managing the impacts of the low carbon transition on infrastructure investments Public Report*. (2019). Climate Wise Insurance Advisory Council.

scenarios, and time horizons. Applying the matrix to an investment portfolio provides insights into how financial exposure to transition risk may materially increase over time and vary significantly between portfolios, depending on the types of assets in which a company invests. This step supports decisions regarding future fund allocation or diversification within the portfolio and also serves as the starting point for both Phase 2 and Phase 3 of the framework.

- 2) Asset-level impact assessment: The second phase allows investors to evaluate the financial impact of the low-carbon transition at the asset level, providing insights on how to enhance asset resilience. Risks vary substantially even among assets of the same type, depending on factors such as geography, carbon intensity, technology (e.g., solar versus wind), and competitive positioning in the local market. Conducting an asset-specific analysis therefore provides a significant advantage. Depending on the portfolio size and the investor's risk appetite, the asset impact identification methodology can be applied to each asset within the entire portfolio or focused on the most exposed assets identified through the Infrastructure Risk Exposure Matrix. Moreover, portfolio stress-testing across different time horizons and scenarios yields a more integrated understanding of transition risks and opportunities. Although this phase requires additional resources for more granular analysis, it is particularly useful for highly exposed assets or for direct application to smaller, less diversified investment portfolios.
- 3) Financial modelling analysis: In the third phase, investors incorporate the potential impacts of transition risks directly into their financial models. This enables a granular approach to defining asset-level impacts and allows investors to assess the key transition drivers influencing the financial performance of assets by integrating the financial factors identified in the first two phases into their internal financial models. Therefore, by adding the projected scale of transition risk components, investors can use the matrix to update their quantification models (such as discounted cash flow or net present value). Leveraging this analysis, investors can identify investment options to strengthen asset resilience or to design appropriate exit strategies.

The most useful advantage of this model is that it can be adapted to investor's need by adding conditions like time horizons and geographical areas.

The second model is the Physical climate risk assessment methodology (PCRAM)⁸⁷, created in 2022 by the Coalition for Climate Resilient Investment (CCRI), that includes governments, companies, intergovernmental bodies and investments funds. The project was then transmitted to the Institutional Investors Group on Climate Change (IIGCC), it aims to create a more resilient financial sector, able to integrate physical climate risks into financial investments strategies. So, the PCRAM is a guide that provides practical tools for identifying and assessing the resilience of infrastructure assets. This methodology is based on four passages and three "gates".

- 1) Data collection: this first passage consists in the definition of goals, the evaluation area and collection of essential climate data for infrastructure assets and their relative critical components, concluding with the identification of KPIs. This first phase ends with a first gate, called "Gate A", where if the data collection was enough consistent, they could have proceeded to the next phase, otherwise the undertaking should have restarted again the process.
- 2) Materiality assessment: in phase 2, the project team develops the inputs for the climate cases using data and assessing the severity of the impact on the infrastructure resulting from the relevant climate risks, using KPIs to quantify the risk. At the end of Phase 2, the project team reaches "Decision Gate B" and determines whether the physical climate risks are material for the assets based on the KPIs. If the risks are not material, the assessment is complete.
- 3) Resilience development: in phase 3, the project team develops the resilience cases, that is, climate cases that take into account adjustments to design, operations, and/or management and investment in an asset to improve its resilience to physical risk. Initially, through discussions among climate professionals, engineers, and asset managers, a list of options is generated to enhance the asset's resilience to material physical climate risks. these resilience cases are re-run through the materiality assessment of the previous phase, in

⁸⁷ *Physical Climate Risk Appraisal Methodology (PCRAM) 2.0.* (2025). IIGCC.

order to measure the expected benefits compared with options costs. At the end of Phase 3, the project team reaches “Decision Gate C” and determines whether adaptation solutions are available to reduce the severity of the impact.

- 4) Economical and financial analysis: in this final stage, the project team performs an economical and financial analysis to reduce the exposure risk of an asset to physical risk, providing resilience options.

The last framework is the Climate Resilience Investment Framework (CRIF) ⁸⁸, created by the IIGCC and published in 2022. This framework appeared on a paper called “Working Towards a Climate Resilience Investment Framework”, its scope was to help investors to adopt mitigation metrics against climate change into their investment strategies. This model is referred only to physical risks, divided in:

- Asset and portfolio risks: It encompasses direct impacts on clients’ assets and projects, as well as the impacts on client’s operations.
- Systemic risks: The impacts of the physical climate are multi-scalar, therefore investors must address these risks at the asset, portfolio, and systemic levels.

To manage physical climate risks comprehensively, the IIGCC proposes six key levers operating at both asset and systemic levels: (1) integration of physical risks and opportunities into investment processes; (2) asset allocation and portfolio construction; (3) alignment, engagement, and asset management; (4) investment in adaptation solutions; (5) policy advocacy; and (6) disclosure. Among these, the first and sixth levers focus on the measurement and disclosure of climate-related risks, while the second concerns risk management, together aligning with the core requirements of the Task Force on Climate-related Financial Disclosures (TCFD) framework.

In conclusion, all three frameworks reflect the growing maturity of approaches to including climate risks in investment portfolios. The Climate Transition Risk Framework has a robust methodology for measuring transition risk and including it in financial analysis, particularly for infrastructure portfolios. The Physical Climate Risk Assessment Methodology (PCRAM) extends this integration by establishing an organized process for identifying, measuring, and physical resilience of assets. Finally,

⁸⁸ *Climate Resilience Investment Framework Disclaimer and Legal Statement*. (2025). IIGCC.

the Climate Resilience Investment Framework (CRIF) extends the vision to a system level, calling on investors to look not only at risk, but also to take broader adaptation and policy advocacy measures. Together, the models indicate that climate risk management of a financial nature is a multi-dimensional process, marrying quantitative analysis, strategic adaptation, and systemic engagement in making portfolios resilient and aligned with global climate objectives.

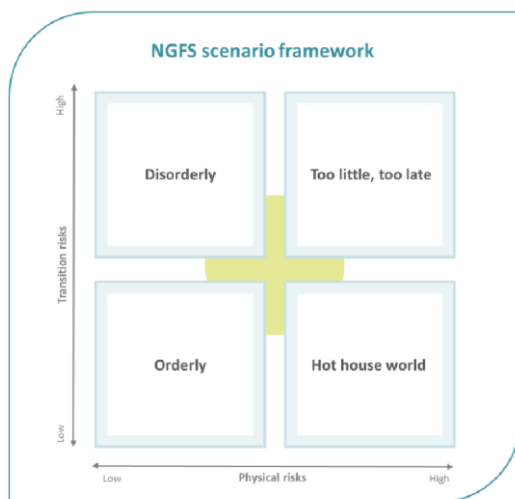
3.5.2 – Climate risks scenarios

Among all the possible enhancements, the Network for Greening the Financial System (NGFS) proposes a particular treatment for climate-related risks. First of all, the NGFS was born in 2017 during the Paris One Plan Summit, founded by 8 central banks, among them there are Banque de France, Bank of England and People's Bank of China⁸⁹. The organization's scope is to create a platform to share best practice on green finance, and also for developing tools that help the integration of environmental risks into the financial system. The NGFS in 2020 developed a tool, which was updated in 2024⁹⁰, that helps different stakeholders: banks, financial institutions, investors and companies to frame physical and transition risks in four categories, according to the policy ambition, policy timing, coordination and technology levers.

Figure 4: The NGFS Scenario Framework

⁸⁹ *Welcome to the NGFS website | Network for Greening the Financial System.* (2017). Network for Greening the Financial System. <https://www.ngfs.net/en>

⁹⁰ *NGFS Climate Scenarios Technical Documentation.* (2024). NGFS.



Note. Source: Network for Greening the Financial System

Figure 4 represents how the framework works, it's a combination of physical and transition risks that may create 4 scenarios:

- **Orderly:** this scenario assumes that ambitious climate policies are introduced early and gradually strengthened, limiting physical risks and keeping both transition and physical risks relatively low.
- **Disorderly:** it assumes that climate policies are delayed or are not coordinated across countries and sectors. Here the physical risk is still subdued, while the transition risk is high.
- **Hot house world:** in this scenario, global warming is not successfully limited due to insufficient global action. Transition risk remains low (as few policies are implemented), but physical risk is very high, with irreversible impacts such as sea-level rise and changes in crop yields.
- **Too little, too late:** this is the worst scenario, it assumes that there is a limited and uncoordinated transition that fails in limiting high physical risks.

Building the four high-level quadrants of the NGFS scenario framework (Orderly, Disorderly, Hot House World, and Too Little, Too Late) would make companies understand the background behind each material risk found, but it also works as a monitoring tool: for example a company that owns a property next to the sea is experiencing a sea-level rise, in this instance the physical risk is present and severe, and transition policies are not being implemented yet, this is the case of a hot house world

scenario. This is a case in which transition risk is still low. In the Disorderly quadrant, transition risks are high while physical risks remain relatively limited. For instance, consider a car manufacturer that continues to invest heavily in internal combustion engine vehicles. If governments postpone climate action until 2030 and then suddenly impose strict carbon taxes and bans on fossil-fuel cars, the company will face significant costs and stranded assets. In this case, physical risks are not yet the main threat, but the abrupt introduction of policies creates a severe transition risk, which is the defining feature of the Disorderly scenario.

To conclude, ESRS E1 provides a good yet complex provision for managing environmental risks, establishing a structured disclosure system that obliges companies to recognize, classify, and quantify both physical and transition risks while linking them to financial impacts across different time horizons. However, its effectiveness is currently limited by the absence of a standardized methodology to measure these effects, leaving undertakings with the burden of developing their own internal approaches, often based on assumptions and parameters that may vary significantly across sectors and countries. In this sense, the integration of complementary tools, such as the NGFS scenario framework, could represent a decisive step forward: not only does it allow companies to contextualize risks within broader macroeconomic and policy pathways, but it also provides a monitoring perspective that makes it easier to anticipate sudden changes and assess long-term vulnerabilities. Combining the prescriptive requirements of ESRS E1 with the flexibility and comparability offered by NGFS scenarios would therefore enhance both the consistency of disclosures and the strategic usefulness of the analysis, helping companies move from a mere compliance exercise to a genuine risk management and resilience-building process. Ultimately, this evolution is crucial to ensure that environmental reporting does not remain a static obligation but becomes a forward-looking instrument able to guide corporate decisions and capital allocation in a decarbonizing economy.

An assumption of the NGFS model is the interconnection of physical and transition risks, it assumes a combination of both, and there is an existing literature that details this link, the next section discusses about it.

3.6 – Corporate challenges in climate risk management and the role of open-source frameworks

This paragraph concludes the topic of the climate-related risks, and it focuses on how companies can manage them by using the existing frameworks. It emerges from the 2024 report of the UNEP called *2024 Climate Risk Landscape Report*⁹¹ that companies find more difficulties in determining those risks than financial institutions and investors.

First of all, the report outlines how current frameworks relating to climate risks are more oriented toward the needs of the financial sector, than those of businesses. The current tools, like the ones seen in the previous sections, are developed to support banks and investors, translating physical and transition risks in financial metrics, or providing different credit loss scenarios.

On contrary, tools developed for non-financial companies remain a more descriptive solutions, with lots of limitations. The UNEP report cites the WWF risk Filter, ENCORE, WRI Aqueduct and CLIMATING as possible tools for companies, stating that they all permit to identify businesses' lacks, although they don't provide a cost-effective translation of risks nor do they support financial planning for adaptation. The WWF Risk Filter Suite, for instance, is an online platform that integrates the Water Risk Filter and the Biodiversity Risk Filter. It enables users to locate production sites or supply-chain nodes and to overlay global datasets on water stress and biodiversity loss. The system produces maps and risk scores for each site, which are useful for identifying mitigation priorities and supporting environmental disclosure. However, it does not quantify the economic impacts or adaptation costs associated with those risks. Similarly, ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure), developed by UNEP FI and UNEP-WCMC, maps the dependencies of economic activities on natural capital, offering a qualitative understanding of environmental vulnerabilities across sectors. Nevertheless, it does not provide a financial estimation of potential damage or monetary exposure. The WRI Aqueduct Water Risk Atlas provides global, high-resolution maps of water-related risks, such as scarcity, drought, flooding, and water quality, allowing companies to identify vulnerable areas and to explore future scenarios

⁹¹ *2024 Climate Risk Landscape Report Contents | 2024 Climate Risk Landscape Report*. (2024). United Nations Environment Programme.

up to 2050. Yet, as in the previous cases, the assessment remains confined to the physical and geographic dimension, leaving firms themselves responsible for translating these findings into economic or financial implications. Finally, CLIMATIG represents a more advanced generation of climate-risk assessment tools. It combines satellite data, climate models, and machine-learning techniques to deliver high-resolution analyses (up to 10 meters) of hazards such as flooding, extreme heat, wind, or wildfires, and includes quantitative estimates of potential losses (Average Annual Loss, Probable Maximum Loss). However, its technical complexity and the costs associated with data access make it largely inaccessible to most firms, particularly to small and medium-sized enterprises.

The report observes that there is a disproportionate regulatory pressure, the demand of risk assessment tools mainly comes from institutions subject to financial disclosure requirements, not from non-financial companies. In addition, the valuation of climate risks is also associated with a sophisticated technical knowledge and data access which are sometimes too expensive for companies, but also hard to be understood, especially for SMEs. It comes out that non-financial corporations act as data providers for financial ones, even if this information is incomplete. Thus, from one side there are companies that are not able to identify and quantify their ESG risks, on the other side financial entities are forced to use limited data.

UNEP suggests filling this gap by creating hybrid tools that combine technical analysis and financial metrics, promoting two open-source platforms: OS-Climate and Net-Zero Data Public Utility (NZDPU), as possible solutions for sharing data and allowing companies to integrate internally climate-risk assessment. OS-Climate, hosted by the Linux Foundation, is described as an open-source data and analytics infrastructure designed to improve interoperability in climate-risk assessment. By providing a shared Data Commons and analytical tools for both investors and corporations, the platform seeks to enable consistent methodologies and promote transparency across the financial and real-economy sectors. UNEP notes, however, that the initiative's technical complexity and reliance on voluntary data contributions may limit accessibility for smaller companies and emerging markets. The Net-Zero Data Public Utility (NZDPU), in turn, is presented as a global transparency initiative that consolidates corporate emissions and transition data into a single, publicly accessible repository. It aims to

standardize disclosure formats and improve comparability of company-level climate data, thus addressing key barriers to consistent financial and corporate climate reporting. The report also highlights ongoing challenges related to data completeness, particularly regarding Scope 3 emissions and verification processes. Together, these initiatives represent early but significant steps toward closing the corporate–finance data gap. According to UNEP FI, both OS-Climate and NZDPU contribute to a more transparent and interoperable climate-risk ecosystem, enabling financial institutions and real-economy actors to base decisions on consistent, comparable, and accessible climate data.

The 2024 report describes the current situation, where non-financial corporations struggle to assess their ESG risks, representing one of the biggest lacks of the sustainability disclosure. The literature and recent studies have shown companies' main issues: lack of knowledge, comparability issues and the need of a standardized methodology. The literature shows that only a fraction of companies, the ones that already face systemic risks, have developed a ESG risk assessment, despite they don't share the same methodology. There is also a considerable gap between financial and non-financial companies, since the firsts have a better knowledge regarding risk management, but they also have more tools. According to the UNEP report, Only a two-way integration between the manufacturing and financial worlds can ensure a comprehensive representation of climate risks and promote a truly sustainable transition.

3.7 – Transparency versus protection of trade secrets: a general overview

This is the second part of the chapter, which moves a critic to another field: protection of trade secrets. The norms that regulate the non-financial disclosure are built to ensure coherence, comparability and transparency, this last point may have conflict with the trade secrets, and different institutes moved critics on this debate. The Omnibus proposal included also this topic, along with the other topics like reduction of the scope and the problem lead on the quantity of information to disclose there was a problem linked to the protection of knowhow or specific agreements with partner in the supply

chain. This situation led to a situation in which companies struggle to find a compromise between compliance and business affairs.

Compliance derives from regulation, and the European Union have raised different concerns about the phenomena called “overregulation”, as pointed out Romana Liuzzo in her article published by *Il Sole 24 Ore*⁹². The article made a comparison between EU and USA, in a time panel of five years, the first produced about 13.000 laws, while the second only 3.500. This overregulation has a cost: it has been estimated a cost of 154 billion of dollars per year the price of regulation. The article also mentions the 2023 Report of the European Investment Bank Group that stated that overregulation may also affect negatively investments, it estimated that for 60% of European companies’ norms are seen as an obstacle to investments, while for 55% of them, norms increase administrative costs. The technological sector is one of the most damaged, there are more than 100 existing laws. All these laws and regulations weaken the EU and the competition with China and USA gets worse.

However, this paragraph and the next ones, will only focus on CSRD regulation and its obligation of transparency. With respect of this topic, it’s paramount important to explain how the CSRD, through the ESRS, has exposed itself in this regard. The ESRS 1 *General Requirements*⁹³ provides information on how to manage this information. The standard states that the undertaking is not obliged to disclose sensitive information and classified information, related to the know-how, intellectual property or the result of an innovation, even if it is considered a material topic. Then the standard explains which conditions enable the company to omit an information if:

- a) It is deemed secret insofar as, taken as a whole or in the specific combination and arrangement of its elements, it is not generally known or easily accessible to individuals who typically handle that kind of information; and
- b) It has a commercial value due to its secrecy; and
- c) The company made several efforts to keep it secret.

⁹² Liuzzo, R. (2025). *Perché l’eccesso di regole diventa una tassa occulta*. Il Sole 24 ore.

⁹³ *ESRS 1 General Requirements*. (2023). European Commission.

If the company meets these criteria, it must disclose all other required information. The company must take all reasonable steps to ensure that, apart from leaving out classified or sensitive information, or particular details relating to intellectual property, know-how, or innovation results, the overall usefulness and relevance of the disclosure is not diminished.

The literature highlights that companies struggle with overregulation when they regard non-financial disclosure, the collision is between the transparency required by the EU Directive and the protection of sensitive information, and the book published in 2025 by Astrid, written by Anna Genovese⁹⁴ fully discuss about it. The authors delve into the Directive 2022/2464/EU, to understand how it works, providing her interpretation. The chapter called *sustainability disclosure and trade secrets* gives an initial overview of this conflict, it argues that according to what the Directive states about protection of critical information, there should an equilibrium in which the company can protect its secrets, provided that the disclosure remains clear and useful. From her interpretation it's crucial to find other ways to communicate such omission, and companies should be provided by structure able to balance these two interests.

For what concerns the companies' point of view, there is stigma in disclosing sensitive information, due to the potential "proprietary costs", namely disadvantages and risks that a company may face when it discloses commercially sensitive information to the public. This issue was discussed by Tuo, L., Rezaee, Z., & Gao, L. (2024)⁹⁵, they analysed U.S. company that voluntarily disclosed sustainability reports from 2005 to 2018 using GRI standards. They noticed a trade-off between a complete disclosure and protection of sensitive information that limits the extend of disclosure, leading to a partial version. The paper argued that managers try to find a perfect equilibrium between non sensitive information and sensitive ones, balancing potential costs and benefits.

Despite the study was conducted on companies not required to disclose according to CSRD, the problem still persists, or it is even worse, given the mandatory nature of the

⁹⁴ Genovese, A. (2025). *La trasparenza societaria per lo sviluppo sostenibile - Il decreto legislativo n. 125/2024 sul rendiconto di sostenibilità*. Astrid.

⁹⁵ Tuo, L., Rezaee, Z., & Gao, L. (2024). Is there a trade-off between management earnings forecasts and sustainability reporting? *Global Finance Journal*, 59, 100908.

Directive. Even if the ESRS 1 allows the omission of certain information, there are still some inconsistencies, and the next paragraph will explore them.

3.8 – Balancing CSRD and CSDDD with the protection of trade secrets

The previous section gave a background on how to deal with transparency and trade secrets, but this paragraph explores the main difficulties to find an equilibrium of both. The following section considers the CSRD and CSDDD provisions, two pillars of companies' sustainable development.

Taking into account again the Astrid book *La trasparenza societaria per lo sviluppo sostenibile - Il decreto legislativo n. 125/2024 sul rendiconto di sostenibilità*⁹⁶, the second chapter of part II discusses about how to behave when the protection of trade secrets compromises a correct and transparent disclosure. the author of this section, Mario Libertini, gives his interpretation on how to deal with it, after a detailed analysis on what European Directive for trade secrets protection says.

The author first analyses how the CSRD treats the conflict, and he interpreted that transparency prevails omission of sensitive information, which can be put in place only for the exceptional cases discussed in the previous paragraph, also cited by ESRS 1. However, the directive affirms that the omission is forbidden when it prejudices a correct and balanced valuation of the company's conduct, of its results and financial situation, and its impacts. But The objective of this amending directive is not to require companies to disclose intellectual capital, intellectual property, know-how or the results of innovation that would qualify as trade secrets within the meaning of Directive (EU) 2016/943(norm that protects this sensitive information) of the European Parliament and of the Council. The disclosure requirements laid down in this amending directive should therefore be without prejudice to Directive (EU) 2016/943. In addition, this interpretative approach is then decisively confirmed by Delegated Regulation (EU) 2023/2772 of 31 July 2023, which says that a company is not obliged to publish sensitive information.

⁹⁶ Genovese, A. (2025). *La trasparenza societaria per lo sviluppo sostenibile - Il decreto legislativo n. 125/2024 sul rendiconto di sostenibilità*. Astrid.

All these provisions struggle with the equilibrium required by the CSRD: The report must not compromise the company's intangible resources, provided that the protection of the company's intangible resources does not compromise the functions of the report. This means that the company must at least mention some circumstances and facts, without compromising the secret. From here, the author adopts a restrictive interpretation of the Directive, so that the provision in question is limited to information that must in any case be disclosed to the market, primarily under market abuse rules, and allows for the omission of such information only on temporary and urgent grounds (imminent developments and ongoing negotiations), but not on a permanent basis.

For what concerns the CSDDD (EU Directive 1760/2024), the interpretation is similar, the norm ask companies to disclose complete information related to their business conduct and due diligence, apart from all sensitive material defined by the Eu Directive 2016/943. But here a different and bigger problem arises, the CSDDD requires companies to analyse the business conduct of all the partners across the supply-chain, the article 5 of the Directive say that partners are not forced to reveal trade secrets, but, in case these information are useful to identify negative impacts on environment and society, then they are forced to communicate it. Obviously, those partners can always rely on Directive 2016/943. So again, there is an issue, if the partners refuse to provide data, then the enterprise must probably change them, that's the interpretation of Mario Libertini. The chapter continues by saying that companies cannot hide behind the right to protect their sensitive information, in fact, there might be a case in which a company exploits this right to put in place negative conducts without being noticed and still protecting their image. And the text provides an example: there is a company that identified a polluting component in one of its products, and there is not an alternative component that can replace it, so the company may state that it is currently doing R&D activities to find another way to produce that good, even cooperating with scientific institutes. The company then can recall its right to not disclose such information, given the secrecy of the agreement stipulated with the institute.

So given this struggle between interests, the author developed three hypothetical situations:

- 1) The first hypothesis arises when the information disclosed by a company is incomplete or insufficient with respect to the essential elements required to verify compliance with due diligence obligations. Such a deficiency may be reported either by stakeholders, pursuant to Article 13 of the Directive, or by the competent supervisory authority, which in turn is empowered to require the company to provide the missing information. In the event of non-compliance, the company may face the sanctions provided under Article 27 of the CSDDD. Moreover, judicial review may be sought, leaving it to the courts to assess the balance struck between transparency and trade secret protection. A variant of this scenario occurs when the company, while providing apparently exhaustive information, omits reference to a significant project of green innovation. In such cases, although the full protection of secrecy may be crucial to securing a competitive advantage, at least a summary disclosure of the existence of a research and development line is considered necessary, particularly to enable supervisory authorities to evaluate the overall evolution of the relevant market and the adequacy of corporate plans.
- 2) The second hypothesis refers to situations in which the information disclosed by the company is, in formal terms, complete and exhaustive, but the measures or sustainability plans described are considered inadequate either by stakeholders or by the competent authority. Here, the dispute shifts from the sufficiency of information to the substantive merits of corporate strategies and the technical discretion of the supervisory authority. Nevertheless, the evaluation of adequacy may still require further investigative steps and, consequently, more detailed disclosures by the company, thereby reactivating the tension between transparency requirements and the safeguarding of confidential information.
- 3) Finally, the third hypothesis concerns cases where the information provided appears complete, yet there are suspicions of its inaccuracy or falsity. In such circumstances, the supervisory authority may resort to its investigative and inspection powers, against which the company cannot invoke trade secret protection. This is expressly confirmed by Directive (EU) 2016/943, which preserves the applicability of Union or national rules requiring the disclosure of trade secrets to public, administrative, or judicial authorities for reasons of

public interest. Importantly, such disclosure to supervisory bodies must be distinguished from disclosure to the public: the former does not annihilate the private-law protection of trade secrets, as the confidential status of the information remains intact in the relationship between private parties.

The author concludes this chapter by saying that the equilibrium between protection of sensitive information and transparency need to be fixed by specialists of the European law. He suggests the development of standards that provide supervisory authorities (and stakeholders) with the essential information necessary to assess whether a company is effectively complying with its obligations under the CSDDD, while at the same time avoiding any disclosure that could undermine or destroy the protection of trade secrets.

3.9 – Sanctions and Liabilities over the sustainability disclosure

This paragraph concludes the legal considerations related to the CSRD application, showing another potential grey zone: the sanctions for sustainability reporting fraud. the Astrid book *La trasparenza societaria per lo sviluppo sostenibile - Il decreto legislativo n. 125/2024 sul rendiconto di sostenibilità*⁹⁷ gives its analysis, written by Anna Genovese. The authors first explain the dlgs. 125/2024, the Italian norm that transposes the CSRD, to clarify which authorities are in charge for overseeing companies' disclosure, and then it talks about who might be liable in a corporation and the amount of the sanctions.

Starting from the auditing phase, the Italian norm differentiates the publicly traded companies and not, the first ones are firstly controlled by auditing firms, and then CONSOB performs a final control; not publicly traded companies are initially controlled by auditing firms as well, and then the MEF makes a final control. Focusing on CONSOB's duty, it must ensure on the transparency, completeness and conformity of the sustainability assessment, this supervision follows a "risk-based" approach, where the bigger the company is, the deeper the control will be; the supervisory body will also consider sector and potential negative impacts of the undertaking. In addition, CONSOB may also cooperate with Bank of Italy to guarantee an integrated control, in

⁹⁷ Genovese, A. (2025). *La trasparenza societaria per lo sviluppo sostenibile - Il decreto legislativo n. 125/2024 sul rendiconto di sostenibilità*. Astrid.

line with CSRD provisions. Although these provisions are well calibrated, the document highlights some criticism: first of all, CONSOB will supervise only publicly traded companies, and despite MEF will supervise not-listed ones, the second will receive a softer assessment than the firsts, according to the author, this situation can cause a disproportionate treatment among companies. Second criticism regards the way of the supervision, CONSOB can just consult company's documents, with the possibility to require corrections, however it has not direct inspection powers similar to those exercised in the accounting or financial fields, thus the author argues that this lack may cause opportunistic behaviours from companies, especially when quantitative data can be only assessed with a direct inspection. To conclude, the author sees CONSOB duty as limited in terms of companies assessed, but also in terms of actions.

Moving to the company members liable for the business conduct, the norm states that managers must draft the disclosure in compliance with the regulations, with professionalism and diligence. Managers can be civilly liable towards the company itself, shareholders, creditors and other parts hurt by a non-correct disclosure. The responsibility concerns negligence, misconduct and fraud. Another liable company's body is the board of auditors, which is in charge for: controlling whether the sustainability assessment is drafted according to CSRD provisions; the transparency of the disclosure. In case the board doesn't perform properly its duties, it will share liability with managers.

The dlgs. 125/2024 inserts the sanctions for non-compliant disclosures into the TUF (*Testo Unico della Finanza*). There are three types of sanctions for companies:

1. A public statement of censure for minor infringements.
2. An order to remedy the irregularity with an obligation to take corrective measures for minor infringements that can be fixed.
3. A fine ranging from €5.000 to €10.000.000, or in serious cases, up to 5% of the company's annual turnover.

Even company members can be subject to fines up to €2.000.000 if their conduct contributed to the infringements. Genovese notes that the sanctioning system introduced by Legislative Decree No. 125/2024 presents several notable strengths. First, the graduated structure of penalties ensures proportionality between the seriousness of the

violation and the administrative response. Second, the link with CONSOB's supervisory powers enhances coherence in practical enforcement and prevents overlap between different authorities. Finally, the extension of sanctions to individual actors reinforces the personal accountability of directors and others involved in preparing the sustainability report (RDS). However, she also highlights important weaknesses: she points out that during the initial implementation phase the legislator introduced transitional mitigating provisions, reducing penalties to ease companies' adaptation to the new regime. While pragmatic, this choice could weaken the deterrent effect of sanctions precisely when the market should be internalising the importance of ESG transparency. Moreover, although normatively coherent, the system risks operating more on a formal than a substantive level, focusing on compliance with documentation requirements rather than on the accuracy and quality of the disclosed sustainability information. Another significant aspect concerns the absence of mechanisms for early settlement of sanctioning procedures, such as reduced payments or administrative plea agreements, introduced to safeguard transparency and the effectiveness of public oversight. Genovese appreciates this commitment to rigour and impartiality but warns that such procedural rigidity might hinder administrative efficiency. Overall, she interprets the new sanctioning framework as an essential element of the decree's credibility, a tool aimed at making sustainability obligations genuinely enforceable by linking transparency to concrete accountability. Yet she also stresses the partial effectiveness, linked both to the transitional phase of the reform and to the broader need to develop a corporate culture of sustainability. Only through consistent and substantive enforcement, Genovese concludes, can the system truly transform sustainability reporting from a mere formal requirement into a lever of accountability and trust within financial markets.

Moreover, the authors recognize that the dlgs 125/2024 represents a good enforcement for the sustainability disclosure, enhancing transparency, but it also stress some criticism : limited supervision for not-listed companies, complexity of the penalty system, the need of a better coordination among supervisory bodies and auditing firms and lastly the possible opportunistic behaviour that may lead to greenwashing or green housing.

3.10 – The Omnibus package and its recent developments

From 2022, the European Union has established the sustainability and ESG landmarks to pursue. At the current year, in 2025, companies, investors, financial authorities and other stakeholders have perceived the directives in different ways. Focusing on the two directives addressed to companies conducts, the CSRD and the CSDDD, they have raised many concerns among companies. Integrating sustainability into the strategy and processes has been perceived quite challenging, as well as the disclosure of impacts risk and opportunities inside the non-financial disclosure. This last section highlights how the European Union is trying to fix complexities related to the two directives, even if it has raised different concerns.

The European plan has received critics inside and outside the Union, in fact Pitel, L (2025)⁹⁸ in a Financial Times article, reports all these concerns. The article says that the biggest business lobbies in France, Germany and Italy fear the loss of competitiveness of EU companies, while others like Patrick Pouyanné, the head of TotalEnergies stated that Europe adopted not-calibrated measures, even if the scope was fair. Khan, Y. & Mackrael, K (2025)⁹⁹ reported that EU member like Germany and France asked for some delays in the application of the two directives, and right-European leaders were absolutely in contrast with these measures. From the United States came other complains, the American Chamber of Commerce hopes that Europe understands the severity of this regulation, especially during this economic situation.

All these rumours also raised opposite concerns, Paul Mertenskotter, associated to the law firm Covington & Burling stated that many enterprises have yet installed and implemented team and internal processes to comply the CSRD and CSDDD, bearing several costs, a step backwards would be an additional cost. Even big food enterprises like Nestlé and Unilever urged the President Ursula Von Derlyen to not change the regulation. Other stakeholders expressed support to the directives, like the ONG E3G, which defended the European position stating that European competitiveness lies under its

⁹⁸ Pitel, L. (2025, February 12). *EU “completely overshooting” on green rules, Siemens Energy boss warns.* @FinancialTimes; Financial Times. <https://www.ft.com/content/98241f9c-7b98-4267-b073-2a2c57a3a548>

⁹⁹ Khan, Y., & Mackrael, K. (2025, February 7). *Europe Is Looking to Roll Back Climate Accounting Rules.* WSJ; The Wall Street Journal. <https://www.wsj.com/articles/europe-is-looking-to-roll-back-climate-accounting-rules-32c72856>

regulation. They emphasized that this is a long-term process designed to improve business planning and support the transition to a low-carbon economy.

All this feedback led the European Commission to rethink the directives, and this process of re-organization was involved in the European plan called Competitiveness Compass¹⁰⁰. This plan aimed to relaunch the European competitiveness was born after Mario Draghi's report on EU competitiveness published on 9th of September 2024, so Europe collected all the recommendations provided by the former EU Central Bank President and in January 2025 released the Competitiveness Compass. This roadmap is focused on three imperatives stated by Mario Draghi:

- Closing the innovation gap
- Decarbonising our economy
- Reducing dependences

These are the bullet points, furthermore, the Competitiveness Compass set up five additional objectives, and among these there is also the Omnibus proposal, a series of provisions that will simplify the CSRD, the CSDDD and the EU Taxonomy.

So, on 26 February 2025 the EU Commission adopted the Omnibus Package it includes amendments to the CSRD and CSDDD. The main changes on the sustainability reporting are the following¹⁰¹:

- Removing around 80% of companies from the scope of the CSRD, so only those companies that have more than 1000 employees and either a turnover above €50 million or total assets above €25 million will be still obliged to disclose.
- Since these requirements for large companies can hurt small and medium companies in the value chain, the Commission will adopt voluntary reporting standards for SMEs developed by EFRAG, in order to protect those SMEs involved in relationships with big companies.
- A simplification of the ESRS
- Delete the proposal of the development of sector specific standards.

¹⁰⁰ *A Competitiveness Compass for the EU*. (2025). European Commission.

¹⁰¹ *Amending Directives 2006/43/EC, 2013/34/EU, (EU) 2022/2464 and (EU) 2024/1760 as regards certain corporate sustainability reporting and due diligence requirements*. (2025). European Commission.

The last change regards the EU Taxonomy instead:

- Only companies having more than 1000 employees and at least a net turnover of €450 million will still be obliged to inform which of their operations can be defined “sustainable” according to EU Taxonomy principles.

These insights are the just a part of the Omnibus proposal, in fact, in a separated document, the Commission discusses on “Stop the clock”, aimed to postpone the disclosure deadlines for different groups of enterprises. This proposal became a Directive on 14 April 2025, member states must ratify in by the end of 2025, it will change CSRD. Companies grouped in the “first wave”, namely those large companies with more than 500 employees won’t change their plans, the proposal doesn’t modify anything for them, and they will disclose the sustainability report in 2025 for the 2024 fiscal year. Other large companies involved in the “second wave” must report in 2026 for financial year 2025. Small and medium enterprises must report in 2027 for financial year 2025.

Europe has planned all these measures to enhance competitiveness and stimulate growth; it recognized that overburdening with excessive regulation would have hurt companies. Simplifying the regulatory landscape will help unlock investment and allow businesses to adopt the transition to a sustainable economy more pragmatically and efficiently. The Omnibus package aims to ease compliance for all companies, while concentrating regulatory efforts on the largest firms that have the greatest environmental and climate impact.

After these procedures, different groups of stakeholders expressed negatively about them, Bogart, J. (2025)¹⁰² grouped different complains: the European Coalition for Corporate Justice (ECCJ) defined those changes as a “large scale deregulation aimed to cut-off corporate liability”. A joint statement from over 170 organizations, including NGOs, trade unions, parliamentarians and influent figures launched the #NoToOmnibus campaign. Even WWF described these modifies as devastating. Other doubts came from by financial authorities like the European Banking Federation (EBF) and the European

¹⁰² Bogart, J. (2025, July 11). Death by Omnibus? The European Commission’s Proposal and the Fate of the Corporate Sustainability Due Diligence Directive (Part II). *Opinio Juris*.
<https://opiniojuris.org/2025/07/11/death-by-omnibus-the-european-commissions-proposal-and-the-fate-of-the-corporate-sustainability-due-diligence-directive-part-ii/>

Banking Authority (EBA), which had a mixed reaction. EBF welcomed the simplification, but fears that reducing significantly the scope of mandatory ESG reporting would leave banks without standardized data, potentially increasing the credit risk, and EBA agreed, adding that this reduction would complicate the banks' ability to assess environmental risks. Furthermore, an exemplary joint release¹⁰³, hardly critiques the Omnibus Package the document was signed by 90 economists from all Europe, and it was not published on a scientific journal. The statement, published on 19 May, defends the CSDDD and the EU Green Deal against proposed rollbacks in the Omnibus I package. The economists argue that the directive is necessary, proportionate, and economically sound, with minimal costs for large companies. They reject the claim that sustainability regulations harm EU competitiveness, pointing instead to structural issues like energy dependence and underinvestment. The document criticizes the misuse of the Draghi Report as justification for deregulation, noting it lacks empirical evidence against CSDDD. Economists warn that limiting due diligence to Tier 1 suppliers would make the directive ineffective. Many businesses are already aligned with its goals. They argue that easing the rules at this time would undermine investors' confidence and lead to legal ambiguity.

On 16 December, the European Parliament approved the Omnibus Package, confirming the rules mentioned above. As regards the CSRD, only companies with over 1000 employees and a net turnover of over €450 million will be required to disclose the sustainability report. Non-EU companies that have generated a net turnover in the EU of over €450 million will be obliged as well to disclose the sustainability assessment. Overall, the ESRS standards will be simplified, and sector-specific standards will be voluntary. In addition, only firms with more than 1000 employees will be required to provide ESG data to their business partners that fall within the scope of CSRD. Moving to CSDDD, only large companies with more than 5000 employees and a net turnover of €1.5 billion will be required to perform due diligence from 2029¹⁰⁴.

¹⁰³ Economists' Statement. (2025). BEYOND SHORT-TERM PROFITS: Why the EU must defend the Corporate Sustainability Due Diligence Directive and the Green Deal. European Coalition for Corporate Justice.

¹⁰⁴ *Simplified sustainability reporting and due diligence rules for businesses* | News | European Parliament. (2025). European Parliament. <https://www.europarl.europa.eu/news/en/press-room/20251211IPR32164/simplified-sustainability-reporting-and-due-diligence-rules-for-businesses>

In summary, the EU's desire to find a balance between economic dynamism and regulatory ambitions is reflected in the Omnibus Package. The argument highlights the increasing conflicts between long term environmental objectives and competitiveness. With the approval of the Omnibus Package, European Union decided to step back, reducing the duties for a very large fraction of companies, while the remaining ones out of scope will probably avoid reporting, or they will disclose information with other frameworks. This decision raises doubts about the effectiveness of the directive and the continuation of sustainability in Europe.

Chapter IV – Desk Analysis conducted on a sample of Energy and Utilities companies.

This final chapter focuses on the ESG reporting of the Italian energy and utilities companies, given the sector's central role in the energy transition and its significant environmental and social impacts. These companies are the most exposed to regulatory, market and stakeholders pressure. The purpose of this last part is to test companies' effort, but it also provides first impressions of this new sustainable disclosure. It starts with a first overview of ESG assessments prior to CSRD introduction of Italian energy and utilities companies, in order to understand how they behaved previously. The second paragraph introduces the desk analysis, which aims to evaluate how businesses have responded to the first year of CSRD application. Double materiality, climate risks, sustainable governance and stakeholder engagement were the four topics of analysis. The chapter attempts to identify new trends, areas for improvement and emerging challenges within this industry by comparing disclosure practices before and after CSRD.

4.1 – ESG position of the Italian energy and utilities sector before CSRD

Given its crucial environmental impact, the energy and utilities sector is essential to the sustainability transition. In recent years, increasing regulatory pressure, investor scrutiny, and climate-related risks have pushed firms in this sector to integrate ESG considerations into their strategies and disclosure practices. In order to give a context of analysis, this paragraph aims to describe how Italian energy and utilities companies relate with sustainability and climate change, covering their commitment to sustainable reporting and their broader efforts in addressing these issues.

Before the CSRD, these companies referred to the previous EU Directive, the NFRD, contributing to the transition toward a less impactfully economy. A relevant contribution to this analysis is provided by Scandura and Thomas (2023)¹⁰⁵, who examined the relationship between non-financial disclosure and the Sustainable Development Goals (SDGs) in major Italian energy companies. The study is focused only on Italian companies operating in the energy and utilities sector, using a qualitative content analysis, the authors investigated sustainability reports of the fiscal year 2022. The reports are assessed through a structured checklist inspired by the Integrated Reporting (<IR>) framework, with particular attention to strategic orientation, stakeholder engagement, governance, performance indicators, and explicit alignment with the SDGs. The results show that companies have made significant progress in environmental and social disclosure. Most reports comply with GRI standards, include methodological sections, and are subject to external assurance, indicating a generally high level of reporting quality. Moreover, companies increasingly reference the SDGs, especially in relation to environmental protection, stakeholder engagement, and social responsibility initiatives. However, the findings also reveal important limitations. While sustainability reports provide extensive information on past actions and impacts, they often lack a clear integration between corporate mission, strategy, and long-term value creation. In particular, governance transparency, future outlook, and the explicit treatment of the six capitals central to integrated reporting remain underdeveloped. The

¹⁰⁵ Scandurra, G., & Thomas, A. (2023). The SDGs and Non-Financial Disclosures of Energy Companies: The Italian Experience. *Sustainability*, 15(17), 12882.

54% of the sample met the <IR> criteria, suggesting that even those disclosures under NFRD struggled in finding a fully integrated ESG approach.

Overall, the study highlights a gap between formal sustainability commitments and the strategic coherence required by advanced ESG frameworks. Although Italian energy companies demonstrate growing attention to sustainability and SDGs, their reporting practices remain predominantly descriptive rather than forward-looking, pointing to the need for further evolution toward integrated reporting models that better reflect long-term ESG value creation.

4.2 – Introduction to the desk analysis: scope

This chapter explores sustainability-related disclosures provided by Italian energy and utilities companies, with a specific focus on the most recent sustainability statements prepared in accordance with the CSRD. The objective of the analysis is to examine how companies are responding to the new European regulatory framework for sustainability disclosure. As the CSRD is being applied for the first time, companies have interpreted and implemented the EFRAG guidelines in different ways. This desk analysis therefore aims to identify areas of relative strength and weakness in current disclosure practices. Overall, the chapter aims to provide an overview of current CSRD disclosure practises in the Italian energy and utilities sector, highlighting common patterns, divergences and areas of interpretative uncertainty in the first year of application.

4.2.1 – Research questions

This paragraph presents the five research questions; everyone accompanied with a brief explanation of their role.

- 1) To what extent do sustainability statements disclose the adoption of a double materiality approach (DM) prior to the introduction of the CSRD?

This question examines whether companies report previous experiences with double materiality before the CSRD became mandatory, in addition it detects to which extent these companies were already prepared on this matter.

- 2) How has the process leading to the determination of climate impacts, risks and opportunities changed since its first pre-CSR model?

This question explores how companies disclose changes in their assessment processes, including the transition from previous reporting frameworks to ESRS-based approaches.

- 3) Have any challenges been identified during the stakeholder engagement?
Furthermore, which are the identified stakeholders?

This question focuses on how stakeholder involvement is presented in sustainability statements and whether difficulties in data collection or engagement are disclosed.

- 4) Have companies disclosed the identification, measurement, and quantification of climate-related transition and physical risks under the CSR model?

This question investigates whether and how companies describe the methodologies used to measure climate-related risks in the absence of a standardized CSR quantification model.

- 5) How is sustainability governance structured following the introduction of the CSR, with specific regard to oversight responsibilities for double materiality and sustainability reporting?

This question examines how governance bodies and committees involved in sustainability oversight are described in the reporting documents.

4.3 – Sample and Sources

The desk analysis is conducted on a sample of Italian companies operating in the energy and utilities sector. The sample includes large, client-oriented multi-utility groups, selected on the basis of their integrated service provision, territorial relevance, and exposure to comparable ESG risks and impacts. The selected companies are ENEL, A2A, ACEA, HERA, Alperia, Dolomiti Energia, IREN, and Edison. Oil and gas companies, companies focused only on the energy production and business-to-business energy and utilities operators are excluded from the sample, as their business models and service structures differ significantly from those of integrated utilities, limiting comparability with respect to the research objectives. The sample does not aim to

represent the entire energy and utilities sector. ENEL, as the leading Italian operator and a global energy company operating in multiple countries, was considered essential for inclusion, representing the international and dimensional benchmark of the sample. A2A, HERA, IREN and ACEA were selected as well, as they are large listed multi-utilities companies, characterized by integrated business models combining energy, environmental services and local public utilities. Edison was included to represent a national energy operator with a business model more strongly focused on electricity generation and energy retail activities, thereby introducing a company less oriented toward the traditional multi-utility structure. Finally, Alperia and Dolomiti Energia, were chosen due to their relatively smaller size and strong territorial roots, in order to highlight potential differences between large listed multi-utilities and medium-sized utilities operating at regional level.

The analysis is based on publicly available sustainability statements covering the fiscal years from 2022 to 2024. Particular attention is given to the most recent disclosures, which for the year 2024 are integrated within the annual financial reports and prepared using a common CSRD-based reporting framework. The availability and consistency of these sources make them particularly suitable for a desk analysis focused on the first year of CSRD application.

4.4 – Methodology

This study adopts a qualitative desk analysis approach to examine what emerges from sustainability disclosures. The analysis is based exclusively on publicly available reports, with a main focus on the latest disclosures from 2024, compliant with CSRD, but also on previous disclosures and aims to assess how key topics are treated in practice. The unit of analysis consists of narrative disclosures, tables and explanatory sections contained in the companies' sustainability statements and integrated financial reports. Particular attention is paid to sections addressing double materiality, climate-related impacts, risk and opportunities (with a focus on physical and transition risks), stakeholder engagement and sustainability governance. The analysis draws on sustainability statements covering the fiscal year from 2022 to 2024. While earlier reports are used to capture continuity or change in disclosure practices for double

materiality, the primary focus is placed on the most recent CSRD-aligned report, corresponding to the 2024 reporting year.

The analytical process was conducted in five steps corresponding to the five research questions (RQ). First, relevant sections of each report were identified based on their alignment with the RQs. Disclosures were compared across companies to identify similarities, differences and recurring patterns, in order to extract trends and insights. This process allowed for a structured comparison of how CSRD requirements are being interpreted and implemented across the selected sample.

To ensure consistency in the analysis, different answers were presented, depending on their nature. For certain questions addressing complex or process-oriented aspects, such as stakeholder engagement, governance structures and climate risks quantification, the work includes also descriptive components.

4.5 – Methodological limitations

As a desk analysis, this study is limited to information explicitly disclosed in publicly available reports and does not account for internal processes or practices that are not formally reported. Consequently, the findings reflect disclosure practices rather than actual implementation or effectiveness. In addition, since it's the first CSRD application, and not every company in the sample was included in the *wave 1 companies* (those companies obliged to report in 2025 for the fiscal year 2024), observed differences in reporting practices may reflect interpretative uncertainty and transitional effects, rather than consolidated or deliberated strategic choices. The focus on large Italian enterprises also limits the generalizability of the findings to other sectors or national contexts.

4.6 – Findings

Starting from *RQ1 – To what extent do sustainability statements disclose the adoption of a double materiality (DM) approach prior to the introduction of the CSRD?*

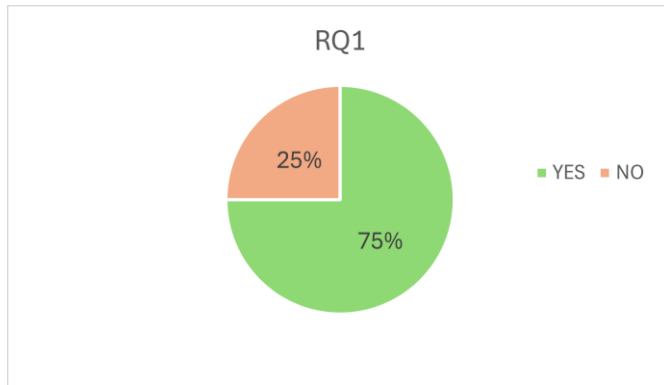


Figure 5: percentage of companies that disclosed double materiality assessment before the CSRD introduction.

Starting from RQ1, the analysis shows that the majority of the companies had already adopted a double materiality approach prior the introduction of the Directive. For this instance, six companies out of eight already applied this approach, where ENEL was the first one, starting with the 2020 fiscal year, while ACEA, HERA, Alperia, Dolomiti Energia and Iren started with the 2022 disclosure. Only A2A and Edison applied the DM the following year, but in both cases it's fair to underline that despite they found some risks or opportunities related to ESG dimensions, they are not included in the materiality assessment, nor they mention a double materiality approach.

Figure 5 summarizes the timing of adoption across the sample. This question is linked to the second one, in fact, once the level of preparation is understood, the second one analyses the process that led all companies to 2024, first year of compliance.

RQ2 - How has the process leading to the determination of climate impacts, risks and opportunities changed since its first pre-CSR model?

Here the question delves into the evolution of the disclosure criteria, every company initially referred to NFRD (2014) to draft their reports, so they started with the materiality approach, based only on impact materiality. It's common to find GRI standard as framework adopted for impacts reporting, and this occurred for 100% of the sample. Then, moving on the first year of DM assessment, the situation is similar among companies, 100% of them applied the following scheme: GRI used for impact materiality and ERM used for the financial one. Some of them also consulted EFRAG guidelines (ENEL, A2A, Alperia, IREN), while only ENEL applied the SASB standard

for the Electric Utilities sector and the Gas Utilities, Solar Technology and Wind Technology sectors for risks and opportunities. In terms of year of application, A2A and Edison applied the DM one year later, for the 2023 disclosure.

Focusing on the second year of DM application, for half of the sample the assessment was the same (ACEA, HERA, Dolomiti Energia, IREN), all of them also consulted the EFRAG guidelines. ENEL again stands out, increasing their communication with EFRAG, in order to handle better the material topics. Alperia is the only case which considered also TCFD (as well as their ERM) for the financial materiality, without changing anything for the impact side. ENEL, HERA and A2A also implemented a materiality matrix to find the material IROs.

RQ3 – Have any challenges been identified during the stakeholder engagement?

Furthermore, who are the identified stakeholders?

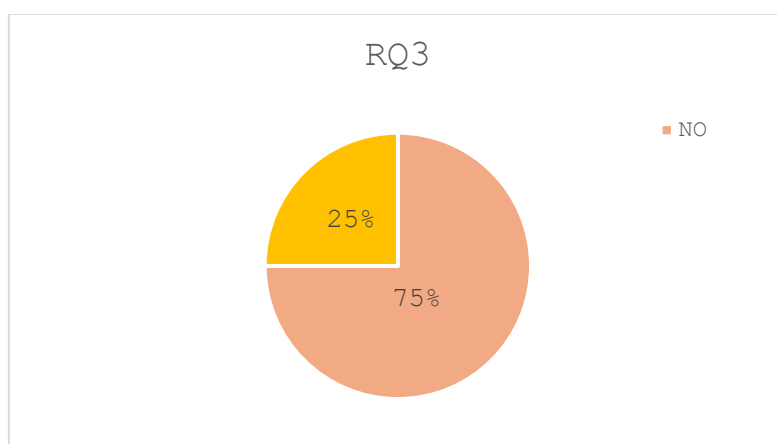


Figure 6: percentage of companies which reported challenges during stakeholder engagement.

The third question refers to stakeholder engagement, Figure 6 shows two different kinds of answers to the question: *Have any challenges been identified during this first year of compliance in relation to the DM and IRO assessment process?* The majority of companies under investigation didn't report any difficulty or lack in the stakeholder engagement (75%); while A2A didn't admit struggles, however, it pointed out having had better communication with some stakeholders, while with others it has been more difficult. The most notable case is Alperia, which reported no significant challenges, however, for 2024, stakeholders were not involved in the double materiality assessment

and, consequently, in the IRO assessment, without explaining the reason why. For what concerns the engagement, the companies relied on ESRS standards, half of them also implemented the AA1000 SES standard (ENEL, ACEA, Alperia, Edison), the other just rely on ESRS procedures.

In terms of stakeholders involved, the two tables below report differences and similarities in the sample:

	CLIENTS	COMMUNITY	HUMAN RESOURCES	INSTITUTIONS	SUPPLIERS	SHAREHOLDERS AND INVESTORS	STAKEHOLDERS ADVISORY BOARD	SUPERVISORY ORGANISM	BUSINESS PARTNERS
A2A									
ACEA									
HERA									
ALPERIA									
DOLOMITI ENERGIA									
IREN									
EDISON									
ENEL									
Total	100%	100%	100%	88%	100%	75%	13%	13%	25%
	Present								
	Absent								

Table 1: types of stakeholders engaged, part one.

	MEDIA	SCIENTIFIC COMMUNITY	GROUP COMPANIES	PEER COMPETITORS	NEW GENERATIONS	SECTOR ASSOCIATIONS	ENVIRONMENTAL ASSOCIATIONS	FINANCIAL COMMUNITY
A2A								
ACEA								
HERA								
ALPERIA								
DOLOMITI ENERGIA								
IREN								
EDISON								
ENEL								
Total	38%	25%	13%	25%	38%	25%	13%	13%
	Present							
	Absent							

Table 2: types of stakeholders engaged, part two.

All of them engaged four types of stakeholders: clients, community, suppliers and human resources, and almost everyone engaged institutions (88%) and shareholders and investors (75%). For what concerns the other kinds, the engagement is uneven.

RQ4 – Have companies disclosed the identification, measurement, and quantification of climate-related transition and physical risks under the CSRD framework?

This question shows a spectrum of different climate-related risks treatment. First of all, the main answer is NO for any company, they all identify their physical and transition

risks, but the measurement and quantification, and their link to expected financial effects is rarely shown. In order to explain how the enterprises have identified climate-related risks, it's essential to show the entities that provide climate scenarios:

International Panel on Climate Change (IPCC)¹⁰⁶, the United Nations body responsible for providing scenarios both for physical and transition risks and the International Energy Agency (IEA)¹⁰⁷, which is specialized in transition scenarios. These bodies help identifying these risks, starting from physical risks scenarios, IPCC has developed three of them:

- Representative Concentration Pathway 2,6 (RCP 2,6) – *best case*: analyses what the effects would be after a global temperature increase of 1.5-2 degrees.
- Representative Concentration Pathway 4,5 (RCP 4,5) – *Intermediate case*: analyses what the effects would be after a global temperature increase of 2.5-3 degrees.
- Representative Concentration Pathway 8,5 (RCP 8,5) – *worst case*: analyses what the effects would be after a global temperature increase of 4-5 degrees.

So, companies may choose one or more scenarios to determine risks, Figure 7 shows which pathways have been selected from companies:

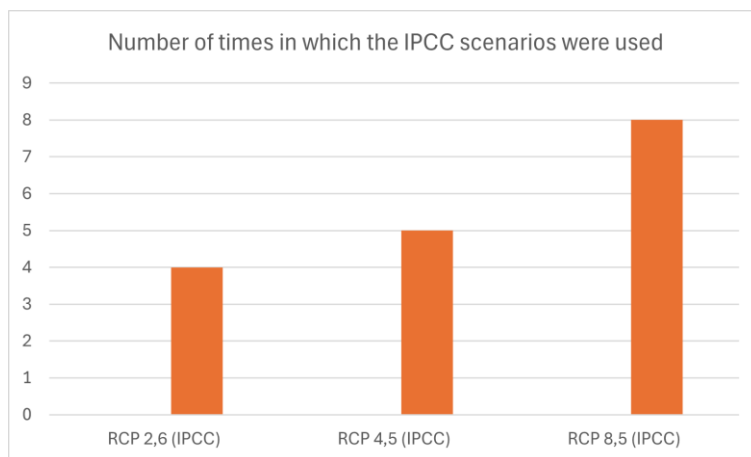


Figure 7: Number of times in which the IPCC scenarios were used.

¹⁰⁶ IPCC. (2024). *About the IPCC*. Ipcc.ch; IPCC. <https://www.ipcc.ch/about/>

¹⁰⁷ International Energy Agency. *About*. IEA. <https://www.iea.org/about>

All companies in the sample used RCP 8,5, the worst scenario, 5/8 the middle one and only half the best scenario. Moving toward the transition risk, IPCC have developed the Shared Socioeconomic Pathways (SSP), they are socio-economic scenarios that describe how the world might evolve in terms of climate policies, economic development, technology and social behaviour; they represent the context of the transition. Moving from SSP1 to SSP5, the world shifts from a sustainable and cooperative development pathway, with strong climate policies and a rapid, orderly transition, toward an increasingly fossil-fuel-dependent trajectory, with weak or delayed policies, carrying higher long-term risks. The other scenarios taken into account are developed by IEA and they are:

- Net Zero Emission by 2050(NZE): A pathway consistent with achieving net zero CO₂ emissions by 2050, requiring rapid decarbonisation, strong climate policies, and a major shift toward low-carbon technologies.
- Announced Pledges Scenario (APS): A scenario reflecting governments' announced climate targets, assuming all pledges are fully implemented, with an intermediate level of decarbonisation ambition.
- Stated Policies Scenario (STEPS): A scenario based on existing and officially announced policies, showing the likely direction of the energy system without assuming full achievement of climate targets.
- Current Policies Scenario (CPS): A conservative baseline assuming only policies currently in force continue, resulting higher emissions and limited decarbonization.
- Energy Technology Perspective – 2 Degrees Scenario (ETP 2DS): A technology-driven transition pathway aligned with limiting global warming to around 2°C, focused on changes in the energy mix and technology deployment.

Figure 8 shows the different adoptions among IPCC and IEA:

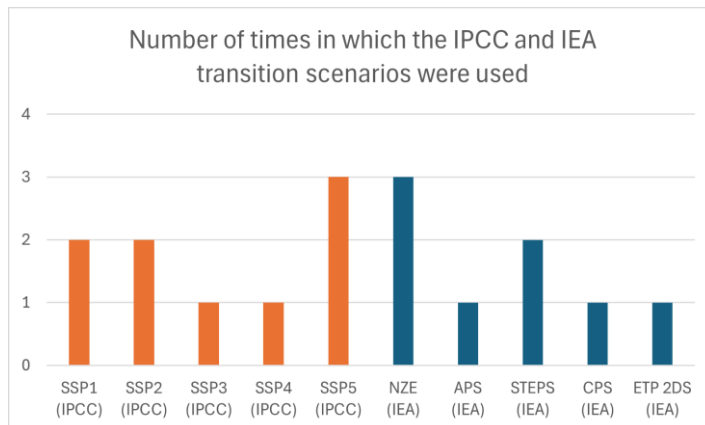


Figure 8: Number of times in which the IPCC and IEA transition scenarios were used.

To conclude the identification process, all companies find these risks, some of them, like ACEA used all the mentioned scenarios for both risks, while others, like Edison and ENEL, combined the physical and transition scenarios to build a more concrete perspective.

When moving toward quantification, the picture changes. None of the companies explained how risks were measured. Only ENEL and A2A reported the expected financial effects, specifically on EBITDA. IREN and Edison declared to be in a phase-in stage, so they decided to not disclose any metrics, while all the others stated to have calculated financial effects on EBITDA, however without showing numerical estimates.

RQ5 – How is sustainability governance structured following the introduction of the CSRD, with specific regard to oversight responsibilities for double materiality and sustainability reporting?

This last question addresses the role of sustainable governance in each company, it emerges from the desk analysis that not every company has a dedicated ESG committee, as shown in Figure 9:

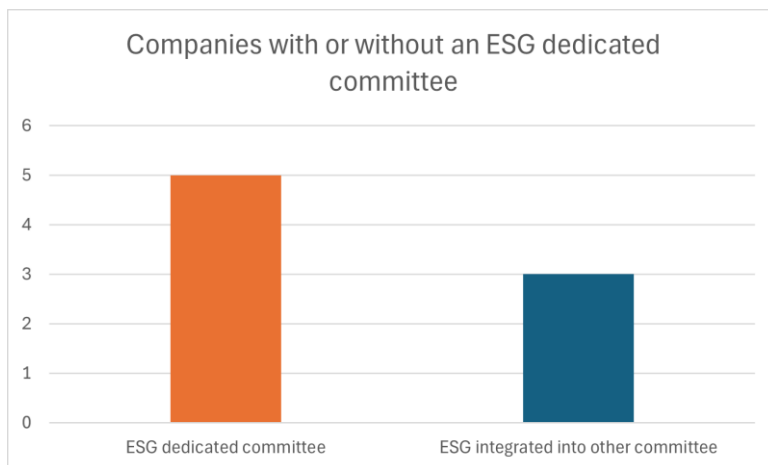


Figure 9: Presence of a dedicated ESG committee

ENEL, A2A, ACEA, HERA and Dolomiti Energia have a dedicated sustainability committee. In any case, with or without a dedicated sustainability committee, its role is always the following:

- Develops sustainability plan.
- Supports the CSRD disclosure.

In some cases, like ENEL, A2A and ACEA they also monitor the DM assessment.

Another difference relates the kind of governance, it emerged two profiles: committee within the board of directors and committee within the supervisory or advisory board, as shown in Figure 10:

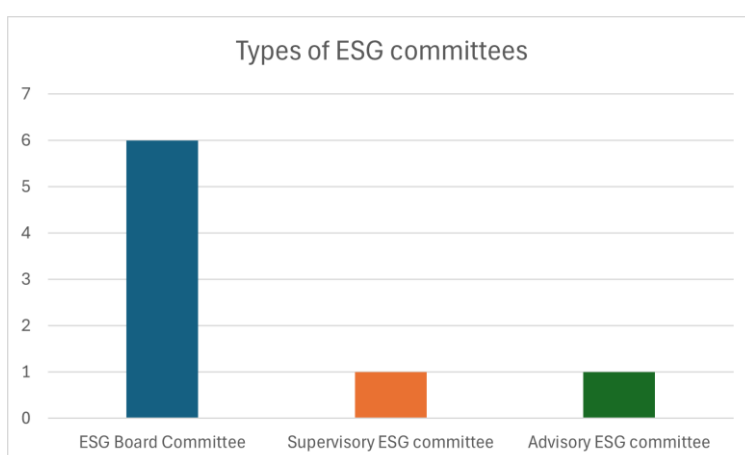


Figure 10: Types of ESG committees

The graph shows that only two companies have a different type of governance related to ESG matters, and they are Alperia and Dolomiti Energia, the first one implemented a committee responsible for overseeing ESG-related risks and compliance processes, here the committee is not in charge to create a ESG strategy; the second one implemented an advisory committee for ESG matters that has to support board of directors, defines objectives and initiatives, but it hasn't decision-making powers. The others six companies adopted a ESG board committee, composed by members of the board of directors.

4.7 – Data Discussion

The primary scope of this desk analysis was to observe how companies have transposed the CSRD directive for their first year of compliance and in order to do that, five topics have been analysed, with a main focus on double materiality approach, that is the core of the new sustainability disclosure and climate risks, that might be a weak spot of the new Directive, especially in the first year of compliance.

The RQ1 shows that almost every company in the sample already adopted the double materiality approach before the CSRD release. this is quite normal for large firms operating in this sector that is strictly connected to pollution and use of resources. This finding can be interpreted in light of the characteristics of the sampled firms: large companies operating in a sector closely linked to environmental impacts and resource use may have already been more sensitive to materiality-related issues prior to the CSRD release. Even though they reported risks and opportunities related to ESG dimension, A2A and Edison didn't disclose a proper DM assessment in 2022, in fact risk and opportunities were not treated the same way, resulting to be a marginal. Moreover, impacts are well discussed, the whole sample adopted GRI framework to measure them, exposing different material topics.

Shifting toward RQ2, that is much connected to the previous one, here the aim is to understand how the trend was leading companies from NFRD (2016) to CSRD (2022). For the financial year 2023 all firms conducted DM assessment thorough GRI for impacts dimension and ERM for the financial one, were there was a major contribution to the first one for two reasons: social and environmental impacts are easier to be

identified, second, GRI frameworks is well known in this field, and the organization has always kept its framework and processes up to date. In fact, the first Directive for sustainability disclosure, the NFRD, was based only on the impact materiality, the concept of DM came some years later, and the related reporting framework as well. Until 2023 there was still a misalignment between the two materiality sides, in fact for any company, the majority of material topics were impacts. This pattern is particularly evident in the energy and utilities sector, where business models are inherently associated with significant environmental and social externalities, naturally leading impact materiality to prevail over financial considerations. Moving on to 2024, things changed, the disclosure is based not only on a new approach, but it also involves a more complete stakeholder engagement, and it reinforces the link between ESG topics and strategy. However, all the companies in the sample struggled in the disclosure of risks and opportunities, and even if the gap between the two perspectives has been reduced compared to 2023, there is still room for improvement. The limited disclosure of quantified financial effects related to climate risks in 2024 should be interpreted not as a lack of relevance, but as a residual methodological and data-related challenge in the first year of CSRD implementation.

The stakeholder engagement research question gave the same results, none of the undertakings reported issues, they already had established procedures since their first year of DM adoption, so the process kept improving. Their connection with stakeholders, especially with the most affected ones, is a common section, probably due to the essential services provided by these businesses, and it can be noticed in 2024 too. The stakeholder engagement is mandatory for the IROs' assessment, the communication with them helps assessing the severity of them, resulting in the identification of material topics. The fact that Alperia didn't include them during the IROs' assessment means that the company isn't still prepared for this process, but it's acceptable since it was not obliged to report the 2024 disclosure.

While from Table 1 and Table 2 it is possible to understand different insights: all of them engaged the communities, and this perfectly aligns with the Social ESRS, where much attention is paid to them. Another interesting topic regards "Future Generations", this category represents younger people, and according to the definition of sustainability, it is important to see care given to them. Furthermore, given the strong

interconnection between this sector and the pollution, from the analysis emerged also environmental associations and scientific community, but just a modest fraction considered them as stakeholders, one out of eight for the first one, and two for the second one, it's probable that these two percentage are going to increase in the following years.

For what concerns RQ4, companies didn't find any difficulty in the identification of transition and physical risks, their quantification instead wasn't disclosed so well. The fact that four out of eight declared to have calculated their financial effects on EBITDA and Capex and Opex without showing how, or neither metrics might be a signal of difficulty. This can be explained in the reports exposed in Chapter III, since EFRAG doesn't provide a unique model to measure these two risks, and this is a grey zone, where undertakings can adopt different frameworks and it results in a non-comparable estimate, which is what CSRD wants to eliminate. Another index of difficulty is the fact that Edison and IREN declared to be in a phase-in stage, where metrics are yet prepared to be disclosed. ENEL and A2A disclosed financial effects only on EBITDA, anyway they didn't explain the adopted model, maybe because they are in a phase-in stage too, and the measures used are not the definitive ones. The same argument can be applied to the other four enterprises.

The last RQ5, reported that five companies out of eight have a dedicated ESG committee, the other two integrated these aspects inside the control and risk committee, In both cases, the common tasks concern decisions on the sustainability report and the sustainability plan, but the dedicated ESG committee includes more tasks like DM analysis, stakeholder engagement, footprint monitoring and creating ESG business strategies. The first type of committees then resulted to be more complex and better structured, providing comprehensive support over these aspects. Then the other differences noticed regards the nature of the committee: six of the examined companies implemented an ESG committee inside the board of directors, which aims to support the board over sustainability and climate-change decision, having also decisional power. Dolomiti Energia implemented a, ESG supervisory committee, linked to the advisory board, and its tasks are similar to the previous six ones, but it has not decisional power, so it's role is weaker in terms of actual support. Alperia instead has a supervisory ESG committee, which oversees all these aspects; however, it isn't in charge to create value

and strategies, although it can be very helpful in ensuring compliance to CSRD and DM assessment.

The firms examined have many things in common, starting from the DM approach, they followed the same pattern between 2023 and 2024, especially for stakeholder engagement and governance structure. For the climate-related risks emerged the same issues, and as presented in Chapter III, this area of the sustainability disclosure remains a grey zone. The IROs assessment was conducted following the EFRAG guidelines without significant problems.

Ultimately, smaller companies like Dolomiti Energia and Alperia showed common features, like the absence of a dedicated ESG committee, resulting in being the least prepared for this report, despite they are now out of scope. ENEL, HERA and A2A are the most prepared firms in the sample, engaging more stakeholders than the other ones and managing to use complex tools like materiality matrices. After all, the companies in the sample are already prepared for such disclosure and the double materiality approach was understood. This means that being in the energy and utilities sector provided these companies with enough knowledge to measure their impacts and understand the ESG risks and opportunities.

4.8 - Doubts and criticisms raised after the first year of CSRD compliance

This section ends the desk analysis chapter by exposing questions, issues and critics. At the moment there aren't reports of organizations that represent the energy and utilities community like Utilitalia and Arera, so the following arguments don't regard only companies operating in that sector, but rather a general view. These concerns have been raised by Assonime, an Italian association that represents and safeguards companies, especially listed ones, moreover it explores topics related to economic development. Assonime's report was released in July 2025, thus it considers the situation pre and post Omnibus and disclosures, providing more complete arguments.

The Assonime report¹⁰⁸ responds to the public consultation launched by EFRAG, which aimed to assess how companies implemented the first EFRAG guidelines and to

¹⁰⁸ *Amended ESRS exposure draft July 2025 public consultation survey. 13/2025. (2025). Assonime.*

evaluate whether the Omnibus Package effectively improved sustainability disclosures. The first question asks if the amendments effectively simplified the DMA process and reinforced the information materiality filter, and Assonime partially agreed: they approved the removal of sub-sub-topics, but they still don't appreciate the materiality scoring system (scale, scope, remediable character), suggesting that a topic can be defined "material" if:

- It constantly influences company's performance, position and development.
- It's important to key stakeholders like investors, employees and affected communities.
- It has potential regulatory or legal implication.
- It affects company's strategic objectives or long-term resilience.

The second question asked if the simplification made the disclosures more comparable among each other's. Here the answer covered different points that from Assonime's point of view are lacks: inconsistency between net and gross calculation, especially the last one that can indirectly hide mitigation actions. Furthermore, they feared the chance of overreporting, meaning the risk of too many material topics. And lastly, they underlined the lack of standards and measures to perform a ESG risks evaluation.

Through this document Assonime confirms the usefulness of relief on disclosure proposed by EFRAG, especially during the first years of compliance. They stated that data collections need time and for certain topics such as merge and acquisition it takes at least six months, so it's about data quality and completeness. They also argued that this reliefs guarantee the construction of a trend over time and they avoid legal risks. to conclude they disagree with disclosure on anticipated financial effects of transition and physical risks, they confirmed what emerged in Chapter III: lack of reliable measures that link these two risks to expected financial effects and lack of comparability.

Assonime also mentioned the need to align with ISSB. The two aspects most appreciated by Assonime are improvement of readability, conciseness and connectivity (connection between financial and sustainability statement) and the reduction of the value chain burdens.

This final stage tried to conclude this chapter with the most current opinions regarding the new sustainability disclosure, in order to give a comprehensive view of this much debated topic. For certain aspects the lack is real: the climate-related risks, it appeared during the desk analysis and in the latest reports like Assonime's one. In other cases, like DM assessment, the analysed company didn't complain or show difficulties, maybe due to their still consistent knowledge. The reduction of supply-chain burdens simplified the commitment of all the companies, especially large multinational businesses like ENEL and the addition of reliefs avoided legal issues.

Conclusion

This thesis was developed with the aim of highlighting the double materiality approach, explaining how it works, how it has enhanced the sustainability statement and how companies can benefit from following it. The path of European Directives led to the CSRD, which incorporated double materiality as the principle that companies must follow to disclose ESG information. To support this thesis, different sources have been consulted: institutional documents, academic literature and financial authorities' reports. In addition, a desk analysis has been conducted to assess initial progresses of the new sustainability disclosures.

The literature review confirmed the usefulness of the new sustainability report, given that it has enhanced transparency and the identification of material topics. Before the CSRD, too many topics were found, struggling to define what were actually material ones, now a more concrete definition of a threshold eases this process. The empirical analysis gave positive results too: the shift toward double materiality recognizes the importance of ESG risks and opportunities, now treated as material topics, just like the impacts. Stakeholders are actually engaged in the IROs assessment now, and more than half of the companies in the sample have implemented a sustainability committee which oversees the sustainability report. Besides these pros, different negative aspects have emerged. Some companies found difficulties in the impacts quantification; others preferred to disclose more risks and opportunities than impacts, due to the strategic relevance of the former. Focusing on the desk analysis, here the main issue concerns the climate risks assessment.

After the first year of compliance, it is possible to identify what does not work in the latest disclosures. First of all, compliance is a huge step and the academic research also underlined that not every company was already prepared to disclose information according to double materiality, it also depended on the sector: firms within highly polluting sectors were more prepared than firms operating in less polluting ones. In this instance, company organization and culture played an important role in the disclosure. Moving on to the critical aspects emerged in Chapter III, but also in the desk analysis, it emerges that physical and transition risks are not well covered by the current standards. Identifying these risks was not the problem, rather it was their quantification, and EFRAAG does not provide a useful model, it leaves this choice to enterprises which may be not prepared. Different models are available, but the lack of a unique model to implement leaves a situation of uncertainty and does not align with the principles that the CSRD is trying to promote coherence and comparability. The desk analysis confirmed these aspects, no firm explicitly stated the model adopted to quantify these risks, in fact all of them used their own ERM, and only ENEL and A2A reported the expected financial effects on EBITDA caused by physical and transition risks. The last problem concerns the balance between protection of trade secrets and disclosure obligations. The omission of sensitive information is allowed only in certain cases, unless it compromise the reports' transparency and the overall understanding of the company's situation. This undefined balance creates a structural tension, requiring clear interpretative criteria and proportionate oversight mechanisms.

However, the legislative path of the CSRD was redefined by the Omnibus Package. In December 2025, the proposal was approved, leading to a reduction of scope and a delayed application of the regulation. This represents a huge step back: Mario Draghi's report and the European and US lobbies' pressures led the European Union to rethink these obligations. In contrast to this situation, other actors expressed negative feedback, some of them complained about the several costs borne to implement CSRD and CSDDD, while ONGs did not welcome this shift at all. Europe was trying to take a position in this scenario of green transition, and the Omnibus approval worsened its situation. The global scenario sees China as the main competitor for green and energy transition, being the most technologically advanced country in this field, able to propose

rare-earth elements at a cheaper cost. Europe instead struggles to find its industrial policy, and this other step back makes its position unclear.

What do these concerns imply? Starting from EU position in this scenario, it's clear that the world is facing a paradigm shift, where renewable energy is becoming increasingly important and the economic activities do not follow anymore a linear process, but rather a circular one. Omnibus provisions imply other concerns: what will happen to the companies out of scope? Probably some of them will continue to disclose the report like those that remain subject to the directive, or perhaps they will apply other standards like the GRI framework, or maybe they will perform a non-comprehensive statement. The ECB took a precise position on voluntary disclosure¹⁰⁹, they recommend continuing to use the ESRS, rather than VSME, namely the standards developed for micro small and medium enterprises. They fear that VSME could be used by large companies out of the CSRD scope, causing a systematic greenwashing risk. This fragmented situation could create different problems for financial institutions and regulatory systems, data collection will be more difficult, due to the reduction of disclosures but also due to the kind of disclosure collected. Banks will then store multiple datasets: compliant and non-compliant disclosures, struggling to produce coherent and complete ESG indicators. This situation will probably lead to more systemic risks and less accountability, threatening the effectiveness as well as the credibility of the sustainability report.

Financial authorities like the ECB welcomed the Omnibus simplification, reducing unnecessary burdens, however they expect that it doesn't undermine data quality and comparability. ECB defends the double materiality, stating that it is the principle from which it's possible to find material impacts risk and opportunities, defining it as a tool that strengthens companies' financial stability and strategy. While talking about results, ECB accepts this initial phase-in of the standards due to the typical difficulties that companies may face, but it expects not to allow companies to postpone their duties over three years. The Bank highlights the importance of the disclosure of anticipated financial effects, because without quantitative data it's difficult to rate the systemic risks. They fear the reduction of data: The less data there is, the less accurate the

¹⁰⁹ *ECB staff opinion on the revised European Sustainability Reporting Standards (ESRS)*. (2026). ECB.

indicators will be, and at this moment, financial authorities need more information to create climate-related risks scenarios.

Among these pros, cons and the different concerns, the number of European companies required to disclose the sustainability report is drastically reduced, probably with the understanding of this process, additional companies out of scope will adopt ESRS like the obliged ones. The lack of quantitative methods to quantify physical and transition risk, will be probably covered with the introduction of a unique methodology developed by EFRAG with other financial institutions. It's important to preserve double materiality as the core of the analysis, quality and comparability must not be undermined, as well as its strategic features. It's possible to think that some stakeholders feared too much the CSRD, probably some eliminated burdens will be gradually introduced over time. This represents a first step for Europe, which is the first area that has created a unique framework for the sustainability report. Anyway, finding a strong position is crucial for Europe, as anticipated before, the world is shifting toward a new paradigm, where the green economy should neither be denied nor feared, but rather accepted and exploited. Energy transition is another bullet point; Europe is unlikely to prevail in a contest based on industrial scale against China and other global players. Rather than seeking to reproduce external models, Europe should focus less on unit production costs of specific technologies and more on system-level outcomes, including average electricity prices, infrastructure resilience and the capacity to integrate high shares of variable renewables without compromising security and efficiency.

Overall, the Omnibus reform significantly reduces the number of companies obliged to report. The current lack of a common quantitative methodology for physical and transition risks could be addressed through future guidance from EFRAG and financial institutions. Preserving double materiality, along with data quality and comparability, remains essential. Although Omnibus reduced the CSRD scope, the directive still represents a crucial step in building a unified European sustainability framework. In a global shift toward green economy, Europe must define a clear strategic position, focusing on system efficiency, resilience and effective integration of renewable energy.

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