Assessing Asset Manager Familiarity with the EU Taxonomy Concerning Climate Risks

Understanding the Compliance Factors, Drivers, Challenges, of the EU Taxonomy concerning climate risks.

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Abstract

This study examines how real estate asset managers engage with the EU Taxonomy in managing climate risks. The study focusses on the EU Taxonomy's climate adaption goal, a classification system created to direct sustainable investment choices. It looks at whether and how asset managers might use this tool to assess adaption efforts in already-existing office buildings. While the Taxonomy sets a framework for sustainable investments, its implementation remains complex. The research explores awareness, alignment challenges, and motivations among asset managers across various real estate sectors. A mixed-method approach was used, combining literature review, semi-structured interviews, and a case study. Findings show that regulatory compliance is the primary driver of alignment, while administrative burdens, financial costs, and data limitations are key barriers. Most asset managers assess alignment after investment decisions, rather than using the Taxonomy proactively. Despite increasing awareness, compliance is often treated as a box-ticking exercise rather than a strategic tool. To improve adoption, the study emphasizes the need for clearer guidance, stronger financial incentives, and better data accessibility to support a more effective and integrated approach to climate risk management in real estate.

Keywords: EU Taxonomy, Sustainability, Asset Managers, Climate Risks, Climate Adaptation

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1 Introduction

1.1 Problem Statement

Climate change presents serious risks to global stability, affecting ecosystems, human societies, and industries. The real estate sector is at the centre of this challenge, both as a contributor to and a victim of climate change. Property values, insurance costs, and investment decisions are increasingly influenced by climate-related hazards, including extreme weather events, rising sea levels, and changing temperature patterns (Warren-Myers & Hurlimann, 2022). As climate risks grow, long-term asset value depends on the ability of buildings to remain resilient to these hazards (Clayton et al., 2021). This highlights the importance of climate adaptation, modifying buildings and urban areas to withstand climate risks, as a critical strategy for real estate stakeholders.

Addressing these climate risks requires a shift toward climate adaptation strategies, which focus on enhancing the resilience of buildings and urban areas to the current and future impacts of climate change. While sustainability certifications such as BREEAM and LEED have grown in popularity, they are primarily concerned with climate mitigation—reducing energy usage and carbon emissions—and frequently neglect the equally important requirement for adaptation measures (Varma et al., 2019). As a result, vulnerabilities to flooding, excessive heat, and other climate hazards remain under addressed.

To minimize these gaps, a growing regulatory framework emphasizes climate adaptation. In Europe, the EU Taxonomy introduces a comprehensive system for classifying environmentally sustainable activities. This regulation not only provides a structured approach to sustainability reporting but also obligates businesses, including real estate investors, to disclose their alignment with either climate adaptation or climate mitigation goals (European Commission, 2024). The EU Taxonomy can be misunderstood as a sustainability rating or design guideline for buildings. However, it is a financial classification system that allows investors to evaluate whether their economic activities align with sustainability objectives. Unlike traditional frameworks, the EU Taxonomy mandates reporting on at least one environmental objective rather than all, allowing real estate stakeholders to focus solely on adaptation or mitigation as a compliance pathway. This research specifically examines how asset managers align with the EU Taxonomy through climate adaptation, as it directly relates to adapting to climate risks.

However, as a freshly introduced system, the EU Taxonomy adds complexity. Asset managers must navigate new technical screening criteria, accurately assess climate risks, and integrate adaptation strategies while adhering to broader reporting regulations like the Corporate Sustainability Reporting Directive (CSRD). Although asset managers are primarily required to report on the activity of Building Acquisition and Ownership, this research focuses on how they can align through adaptive renovation measures within the EU Taxonomy framework. The extent to which asset managers understand these compliance requirements, the drivers influencing their alignment decisions, and the challenges they face remains unclear.

This lack of clarity is significant because effective compliance is crucial for ensuring long-term asset viability, regulatory conformity, and market competitiveness. Properties that are not in line with sustainability goals face depreciation, lower market value, and higher insurance costs, whereas those that incorporate resilience measures are more likely to attract investment and retain value (Warren-Myers & Hurlimann, 2022). By investigating asset managers' familiarity with the EU Taxonomy’s climate adaptation criteria, as well as the key compliance factors, drivers, and barriers, this research seeks to provide insights into improving alignment strategies within the real estate sector.

1.2 Research Aim

The aim of this research is to understand how familiar real estate asset managers are with the EU Taxonomy regulations related to climate risks. Climate change is a growing challenge for the real estate sector, and addressing its risks requires asset managers to align their decision-making with regulatory frameworks that focus on climate adaptation. While the EU Taxonomy includes multiple environmental objectives, asset managers are only required to align with one. This research focuses specifically on climate adaptation, as it directly relates to managing climate risks in real estate portfolios.

This study explores the extent to which asset managers recognize and incorporate climate risks into their strategies and how they align their actions with the EU Taxonomy's climate adaptation requirements. It also aims to identify the challenges they face in applying these regulations, such as understanding the criteria, assessing risks, or implementing adaptation measures.

By gaining insights into the awareness and practical application of the EU Taxonomy's climate adaptation framework, this research seeks to provide recommendations for improving the connection between regulatory requirements and sustainable real estate practices. The goal is to support the real estate sector in building resilience to climate risks and effectively aligning with sustainability goals.

1.3 Research Question and Sub-questions

To answer the problem statement the main research question of this research is:

How familiar are real estate asset managers with the regulations of the EU Taxonomy concerning climate risks?

To support the main research question, the following sub-questions are posed:

1. What specific climate risks are relevant to existing real estate?
2. How do asset managers align climate risk measures with the EU Taxonomy?
3. What motivates real estate asset managers to incorporate economic activities in alignment with the EU Taxonomy?
4. What challenges do asset managers face in complying with the EU Taxonomy's criteria?
5. How do cost and administrative burden influence an asset manager's decision to pursue EU Taxonomy alignment in the case study?

1.4 Research Relevance

The importance of this research comes from its contribution to understanding the socioeconomic, scientific, and environmental issues linked with climate-related risks in the real estate sector. By focusing on real estate asset managers' awareness of the EU Taxonomy, specifically regarding climate adaptation, this study makes significant contributions across several aspects.

Socioeconomically, this study examines how asset managers integrate climate risks and align their decisions with the EU Taxonomy's climate adaptation criteria. The findings can help stakeholders, such as policymakers, industry experts, and investors, identify areas where improved regulations, practices, or educational initiatives are needed to enhance real estate's climate resilience.

From a scientific standpoint, this study adds to the body of literature on climate risks and adaptation in real estate, an area that has been far less investigated than climate mitigation. By identifying specific climate hazards and examining how asset managers assess and

prioritize these risks, this study improves our understanding of adaptation strategies in the built environment. By comparing asset managers' motives and obstacles to existing climate risk frameworks and regulatory requirements, it provides valuable insights into the alignment of industry practices with governmental aims.

This research also supports environmentally sustainable real estate strategies by assessing how well asset managers align their activities with the EU Taxonomy's climate adaptation requirements. These efforts are crucial for preparing buildings to withstand future climatic challenges and ensuring long-term asset viability, ultimately benefiting both the environment and society.

1.5 Theoretical Background Summary

To provide a foundational understanding of the research context, this section briefly introduces key concepts related to climate risks, the EU Taxonomy, and decision-making in real estate investment. These concepts form the theoretical backbone of the study and help clarify the factors influencing asset managers' awareness and compliance with sustainability regulations, specifically in relation to climate adaptation.

Climate risks significantly impact the built environment (Mahmoud, 2020). These risks can be categorized into physical risks (e.g., flooding, heatwaves, sea-level rise) and transition risks (e.g., regulatory changes, shifting market preferences, and investor expectations). The increasing frequency and severity of climate-related events threaten asset values, operational efficiency, and long-term investment security. Consequently, asset managers must integrate climate adaptation strategies into their decision-making processes to reduce financial and regulatory risks.

The EU Taxonomy is a classification system established to define environmentally sustainable economic activities, guiding investment toward climate resilience and sustainability. While the Taxonomy includes multiple environmental objectives, asset managers are only required to align with one. This study focuses specifically on climate adaptation, as it directly relates to managing climate risks in real estate portfolios. For real estate, the EU Taxonomy sets criteria for climate adaptation measures, requiring asset managers to assess their buildings against technical screening criteria. Compliance involves detailed reporting obligations, including demonstrating that investments contribute to adaptation objectives while meeting the Do No Significant Harm (DNSH) principle and minimum safeguards.

Real estate asset managers operate in a complex environment influenced by financial viability, regulatory compliance, and market dynamics. Decision-making is shaped by institutional pressures, including regulatory mandates (coercive pressure), industry standards and ESG benchmarks (normative pressure), and competitive behaviour (mimetic pressure). Although asset managers are primarily required to report under the EU Taxonomy's Building Acquisition and Ownership category, this research focuses on alignment through adaptive renovation measures. Asset managers must balance the costs and administrative burdens of compliance with the potential benefits, such as improved asset value, risk reduction, and access to green financing.

1.6 Research Approach

The research integrates both a literature review and empirical methods to address different aspects of the research questions. Certain research questions are best addressed through an analysis of existing literature, while others require direct input from asset managers. This study follows a qualitative research approach, using primary data from academic sources and primary data from policy sources alongside semi-structured interviews.

- **Literature Review:** This component of the research focuses on theoretical concepts and regulatory frameworks relevant to climate risks, sustainability reporting, and decision-making in real estate. It serves to establish the foundation for understanding the EU Taxonomy's climate adaptation requirements, the challenges asset managers face, and the broader implications of adaptation in real estate investment. The literature also helps define key terms and outline institutional pressures that influence asset managers' decisions.

- **Empirical Research**: To complement the literature study, qualitative semi-structured interviews were conducted with real estate asset managers. These interviews explore their awareness, motivations, and challenges in aligning with the EU Taxonomy's climate adaptation criteria. The interviews also include discussion on a hypothetical case study scenario to assess how asset managers evaluate adaptation measures and regulatory compliance in practice.

The combination of literature study and interviews ensures that findings are grounded in both existing knowledge and practical insights. This qualitative approach provides a structured theoretical foundation to contextualize the study and a real-world perspective on how asset managers engage with the EU Taxonomy's climate adaptation requirements.

1.7 Scope

The scope is limited to real estate in Europe, with a specific emphasis on the Netherlands. This geographic focus reflects the regulatory context of the EU Taxonomy and its application within the Dutch real estate market. The research considers both physical and transitional climate risks and explores how asset managers respond to these challenges through climate adaptation measures.

The study primarily investigates the awareness, decision-making processes, and strategic responses of asset managers regarding EU Taxonomy compliance for climate adaptation. The study does not review all six environmental objectives of the EU Taxonomy, neither does it examine reporting or disclosure requirements. Instead, it focusses on the adaptation objective as applied to existing office buildings in the Netherlands.

While it incorporates financial considerations as part of the decision-making landscape, it does not include an in-depth financial analysis of real estate investments or a technical assessment of specific adaptation measures. However, a brief financial analysis is included to evaluate the additional costs associated with aligning adaptation measures to the EU Taxonomy and its implications for asset managers' decision-making.

Instead, the research seeks to identify the barriers and enablers of climate adaptation alignment within the EU Taxonomy and provide practical recommendations for improving compliance in the real estate sector.

1.8 Reader's Guide

The thesis is structured as follows:

1. **Introduction**: Defines the research problem, aim, and relevance. It introduces the EU Taxonomy as a regulatory framework and presents the main research question along with the supporting sub-questions.

2. **Research Method:** Explains the qualitative research approach, which includes a literature review, semi-structured interviews, and a case study. This section describes how data was collected and analysed to understand asset managers' decision-making regarding climate adaptation in real estate.

3. **Literature Review**: Provides the theoretical foundation for the study, covering climate risks, sustainability regulations, and decision-making in real estate investment. The first sub-question, which examines the specific climate risks relevant to existing real estate, is addressed in this chapter. It distinguishes between physical risks (e.g., flooding, heat stress, subsidence) and transition risks (e.g., regulatory changes, shifting investor preferences).

4. **Case Study**: Investigates the financial and strategic implications of aligning a renovation project with EU Taxonomy criteria. A Dutch office building is analysed to assess the costs, administrative requirements, and potential benefits of compliance.

5. **Results**: Presents findings from the interviews with asset managers, focusing on their awareness, motivation, barriers to compliance, and the perceived impact of the EU Taxonomy on their investment strategies.

6. **Discussion**: Interprets the research findings in relation to the existing literature. It explores the role of institutional pressures (coercive, normative, and mimetic), examines why compliance remains primarily regulation-driven, and highlights key obstacles such as administrative complexity and financial costs.

7. **Conclusion**: Summarizes key insights, answering the sub questions and the main research question on asset managers' familiarity with the EU Taxonomy and their approach to compliance. It reflects on the gap between regulatory expectations and practical implementation.

8. **Recommendations**: Suggests ways to improve EU Taxonomy adoption, including targeted training programs, streamlined reporting processes, financial incentives, and better data availability. A shift from compliance-driven to strategy-driven alignment is recommended to enhance real estate resilience to climate risks.

2 Research method

This research employs a mixed-method approach to investigate real estate asset managers' familiarity with the EU Taxonomy concerning climate risks and their decision-making processes regarding alignment. The study combines literature review and semi-structured interviews to ensure a comprehensive understanding of both theoretical and practical perspectives. The research follows a sequential approach, where literature findings provide the groundwork for structuring interviews, and interview insights build upon these foundations to offer empirical validation and deeper practical understanding.

2.1 Research methods

This study uses a mixed-method approach, combining (1) a literature and document review, (2) a case study and (3) semi-structured interviews. By using several approaches, the research is based on a well-founded theoretical basis and empirical insights from practice.

2.1.1 Literature and Document Study

The literature and document review focuses on identifying relevant climate risks for existing real estate and understanding the requirements and relevance of the EU Taxonomy and related frameworks (such as the Sustainable Finance Disclosure Regulation (SFDR), and the Corporate Sustainability Reporting Directive (CSRD)). The literature study covers scientific articles, industry reports, and policy documents. The document analysis includes primary sources such as the EU Taxonomy itself and related official directives. This lays the conceptual groundwork for identifying key climate risks (Sub-question 1) and clarifying how asset managers might align measures with the EU Taxonomy (Sub-question 2).

2.1.2 Case Study

The case study applies theoretical and empirical findings to a hypothetical scenario based on a real-world case, where an asset manager evaluates aligning a building with the EU Taxonomy's climate adaptation criteria. It examines decision-making processes, challenges, and trade-offs in compliance, focusing specifically on the feasibility of implementing climate adaptation measures.

The selected building is in the Netherlands and is exposed to physical climate risks such as flooding and extreme heat, necessitating adaptation measures. The case study assesses both financial and administrative compliance implications, including the additional costs, regulatory requirements, and reporting obligations associated with EU Taxonomy alignment. By analysing the decision-making process, financial impact, compliance challenges, and motivations for alignment, the study evaluates whether an asset manager would still choose to align with the EU Taxonomy after assessing the associated costs and administrative burdens (Sub-question 5).

The case study methodology involves data collection from multiple sources, including internal reports, financial estimates, and relevant regulatory documents. The analysis covers aspects such as:

- **Compliance feasibility**: Determining how the proposed adaptation measures should be aligned with the EU Taxonomy's substantial contribution criteria and Do No Significant Harm (DNSH) requirements.

- **Cost-benefit considerations**: Evaluating both the direct costs of adaptation measures and the potential financial benefits, such as increased asset value, reduced insurance costs, or improved investor attractiveness.

- **Challenges and barriers**: Identifying potential obstacles to compliance, including data gaps, regulatory ambiguities, and administrative complexities.

2.1.3 Semi-Structured Interviews

The second phase involves semi-structured interviews with asset managers working in various types of organizations (e.g., pension funds, asset management firms, real estate funds, and institutional investors). These interviews provide insights into how climate risks are managed in practice, how managers deal with EU Taxonomy criteria (Sub-question 2), what motivates them to align with these criteria (Sub-question 3), and which challenges they face (Sub-question 4). During the interview the case study is also covered to assess their decision making in a hypothetical scenario (Sub-question 5). This qualitative data helps the theoretical findings with practical perspectives and real-life experiences.

The table below categorizes different roles of the 8 interviewees in the real estate investment sector based on their organizational type and primary functions. It distinguishes between Institutional Investors Managing Real Estate for Pension Funds, Stock-Traded Real Estate Investment Firms (REITs), and Real Estate Investment and Management Firms. Each role is classified according to its investment strategy, management approach, operational focus and type of real estate they manage.

Role	Category	Justification	Type of Real Estate
Asset manager	Institutional Investors Managing Real Estate for Pension Funds	Manages real estate investments primarily for institutional clients like pension funds, focusing on long-term stable returns.	Offices
Technical asset manager	Institutional Investors Managing Real Estate for Pension Funds	Manages real estate investments primarily for institutional clients like pension funds, focusing on long-term stable returns.	Retail
Technical asset manager	Institutional Investors (Stock-Traded Real Estate Investment)	A publicly traded REIT, investing in office real estate with a market-driven, shareholder-focused investment strategy.	Offices
Technical asset manager	Real Estate Investment and Management Firm	Actively invests in and manages real estate properties, providing portfolio and asset management services rather than functioning as a REIT or pension fund asset manager.	Housing
Technical asset manager	Real Estate Investment and Management Firms	Acts as a real estate investment and asset management firm, managing and optimizing properties for institutional clients rather than functioning as an institutional investor itself.	Mixed
Asset manager	Real Estate Investment and Management Firms	Provides investment and asset management services, structuring joint ventures and directly managing real estate assets for institutional and private investors.	Offices
Asset manager (Director)	Real Estate Investment and Management Firms	Engages in real estate investment and asset management, working with institutional investors, family offices, and high-net-worth individuals in a hands-on investment approach.	Housing
Asset manager (Director)	Real Estate Investment and Management Firms	Focuses on acquiring, developing, and managing real estate assets, implementing ESG strategies while investing on behalf of private and institutional investors.	Retail

Table 1: Roles, categories, justification and type of real estate of the participants (own work).

2.2 Data Collection

2.2.1 Data Type

The research material consists of primary data obtained from literature, policy documents, reports, and data collected through semi-structured interviews.

Literature (academic articles and industry reports):
These sources will be gathered from academic databases (e.g., Scopus, Web of Science) and from reputable organizations like the European Environment Agency or UNEP FI. Consultant reports (e.g., McKinsey, CBRE) may also provide insights into how climate risks affect real estate. Information for the case is retrieved from academic sources and industry data for cost estimation. Keywords included “climate risks,” “real estate,” “EU Taxonomy,” “sustainable finance,” and “building adaptation.”

Policy and Regulatory Documents:
A key part of the primary data involves examining EU-level legislative and policy documents that shape how climate risks and sustainability reporting are regulated and guided. Documents such as the EU Taxonomy Regulation, the Sustainable Finance Disclosure Regulation (SFDR), and the Corporate Sustainability Reporting Directive (CSRD) were collected directly from the official websites of the European Commission and related EU agencies. These primary legal texts were supplemented by guidance documents, FAQs, delegated acts, and technical screening criteria published by the European Commission. Additionally, online tools and platforms provided by EU bodies. For example, the EU Taxonomy Compass tool or specific sectoral guidelines were consulted to clarify the practical steps for classification and reporting under the EU Taxonomy (appendix 1).

Semi-Structured Interviews:
Participants will be selected from a diverse range of organizations, including institutional investors, pension funds, real estate funds, and property management companies. This ensures a broad representation of perspectives on climate risks and EU Taxonomy alignment. Potential participants will be identified through professional networks, industry associations, and referrals from initial contacts.

The data collection process follows a structured approach, focusing on respondents' direct experiences with climate adaptation in real estate. The study explores participants' awareness of physical and transitional climate risks (Sub-question 1), their approach to aligning with the EU Taxonomy’s climate adaptation criteria (Sub-question 2), their motivations for doing so (Sub-question 3), the challenges they face in compliance (Sub-question 4), and their perspectives on real-world adaptation measures (Sub-question 5). These perceptions are analysed to assess key themes related to regulatory alignment, financial feasibility, and strategic decision-making in the real estate sector:

- **Awareness and Familiarity with the EU Taxonomy**: Understanding asset managers' knowledge levels and engagement with taxonomy regulations.

- **Decision-Making Processes**: Examining how EU Taxonomy considerations are integrated into investment strategies and building management.

- **Barriers to Compliance**: Identifying the financial, administrative, and technical obstacles encountered.

- **Motivators for Alignment**: Exploring what drives organizations to comply with the EU Taxonomy, including regulatory, market, and stakeholder pressures.

- **Methods of Climate Risk Assessment and Data Collection**: Investigating how asset managers assess climate risks and the tools they use.

- **Implementation of Climate Adaptation Measures**: Understanding whether and how adaptation measures are practically implemented.

- **Institutional Pressures and Market Trends**: Assessing the role of investors, tenants, and regulators in shaping compliance behaviours.

- **Outlook and Strategic Planning**: Evaluating how organizations anticipate and prepare for future regulatory developments.

2.2.2 Data Collection Process

For each individual sub-question, the data collection is as follows:

Sub-question 1 (Specific Climate Risks):
Data will be collected mainly from the literature and policy documents (appendix A of the EU Taxonomy (see appendix 2)) to compile a list of relevant climate risks (e.g., flooding, storms, sea-level rise, heatwaves, subsidence).

Sub-question 2 (Aligning with the EU Taxonomy):
First, the literature and document review will clarify EU Taxonomy criteria. Interviews will then show how asset managers interpret and apply these criteria in practice.

Sub-question 3 (Motivations):
Motivations mentioned in literature (e.g., improved reputation, investor demands, compliance with law) will be tested and explored in the interviews to understand their actual importance and relevance.

Sub-question 4 (Challenges):
Literature may point out potential barriers (like data quality or complexity of requirements), but interviews with asset managers will provide concrete examples and a clearer picture of the challenges they encounter.

Sub-question 5 (Case Study):
Literature will provide insights into the financial and administrative challenges associated with EU Taxonomy compliance, while internal reports and financial estimates will help assess real-world costs. Interviews with asset managers will offer perspectives on whether the perceived benefits outweigh the burdens and how organizational strategy influences the final decision. By combining these sources, the addition of the case study will capture both theoretical considerations and practical experiences in determining alignment feasibility.

2.3 Quality of the Research Material

Several measures ensure the quality and trustworthiness of the research materials and the analysis:

- **Triangulation:**
  By using multiple data sources (literature, policy documents, and interviews), the validity of the findings is improved. Any inconsistencies between sources will be carefully examined.

- **Transparency in Data Collection**
  The steps taken to select literature and policy documents (such as search terms and selection criteria) will be documented. The selection procedure for interview participants will also be transparent, explaining how they were approached and why they were chosen.

- **Limitations**
  Potential limitations (e.g., a relatively small number of interviews or a selection bias in literature) will be acknowledged. The impact of these limitations on the interpretation of the findings will be discussed in the discussion.

2.4 Data Analysis

The analysis takes place in four stages: (1) analysis of literature, (2) analysis of data from policy documents, (3) qualitative analysis of data from interviews, and (4) case study analysis.

2.4.1 Analysis of Literature

The literature review establishes a theoretical foundation for the study by identifying key themes related to climate risks and decision-making processes in EU Taxonomy compliance. The key research questions guiding this review include:

- Which climate risks are relevant to existing real estate, and how are they categorized?
- What factors influence asset managers' decision-making processes regarding alignment with the EU Taxonomy?
-

The insights gained from the literature review help shape the study's conceptual framework, defining core themes such as climate risks, compliance factors, and regulatory pressures. These themes also inform the structure of the interviews.

2.4.2 Analysis of Policy Documents

Alongside the literature review, this study analyses data from official policy documents to assess the regulatory framework governing EU Taxonomy compliance for climate adaptation. This stage focuses on key EU regulations, national implementation guidelines, and industry compliance reports. The key questions driving this analysis include:

- How do official policy documents define climate adaptation measures under the EU Taxonomy?
- What are the specific technical screening criteria and reporting obligations for real estate asset managers?

By examining these regulatory texts, this policy analysis provides a clear understanding of compliance expectations and identifies potential challenges asset managers face.

2.4.3 Analysis of Case Study

The research also incorporates a case study to provide an example real-world application of asset managers' decision-making in the context of EU Taxonomy alignment. The case study is presented to the respondents during the interviews. The case study examines:

- How do asset managers evaluate aligning an existing building with the EU Taxonomy?
- What do they think of the challenges, trade-offs, and financial considerations involved in compliance?
- What is the impact of adaptation measures on long-term investment viability?

The case study provides a practical perspective on alignment feasibility.

2.4.4 Analysis of Interview Data

The interview data will be analysed thematically, focusing on key criteria relevant to understanding asset managers' familiarity with climate risks and the EU Taxonomy. The analysis followed the steps outlined by Braun and Clarke (2006):

1. **Familiarization with the Data**: Reviewing transcripts to gain an overview of recurring patterns.

2. **Initial Coding**: Identifying relevant codes across interview responses.

3. **Generating Themes**: Grouping related codes into broader thematic categories.

4. **Refining Themes:** Adjusting categories to ensure coherence and depth of analysis.

5. **Reviewing and Defining Themes**: Finalizing the themes to be used in the results chapter.

For each critical aspect of the research, such as barriers, challenges, motivations, and technical difficulties, the responses will be quantified and translated into graphs. These visualizations will allow for a clearer comparison between different viewpoints, helping to assess how well asset managers understand climate risks, what motivates them to comply with the EU Taxonomy, and what obstacles they face in doing so.

By grouping responses into relevant categories and representing them graphically, the study will highlight key insights regarding regulatory awareness, financial feasibility, and strategic decision-making among asset managers. This structured approach ensures that the findings are accessible and can be used to draw meaningful conclusions on the practical implications of EU Taxonomy compliance in the real estate sector.

2.5 Conceptual Framework

This conceptual framework illustrates the relationship between climate risks, regulatory compliance, asset managers' decision-making, and the outcomes of compliance or non-compliance with the EU Taxonomy. It provides a structured model for analysing how asset managers perceive, assess, and respond to climate risks within the regulatory landscape.

The framework integrates key components: (1) Climate Risks Impacting Real Estate, which drive the need for adaptation; (2) EU Taxonomy Climate Adaptation Compliance, which sets the legal and financial context for decision-making; (3) Asset Managers' Decision-Making, influenced by external factors, financial considerations, and institutional pressures; (4) Barriers & Enablers to Compliance, which either facilitate or hinder alignment; and (5) Compliance vs. Non-Compliance Outcomes, which define the consequences of alignment decisions.

Additionally, external influences and unknowns, such as evolving regulations and market dynamics, play a role in shaping asset managers' decisions. The framework is supported by multiple data collection methods, including a literature review, policy document analysis, interviews, and a case study.

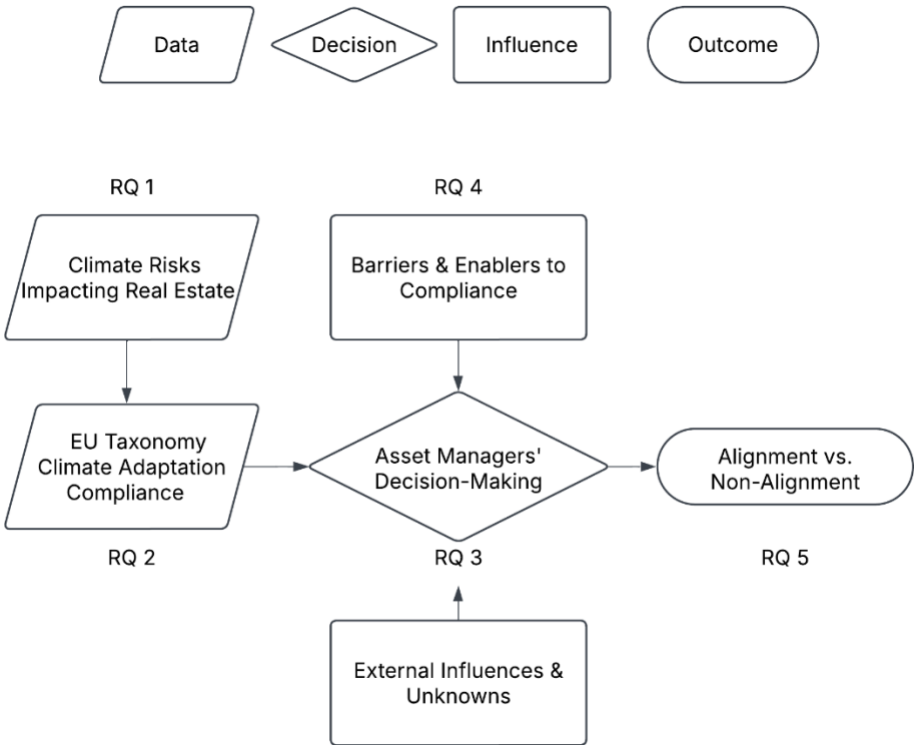


Figure 1: Conceptual framework of the research (own work).

3 Literature review

The literature review aims to explore the impact of climate risks on real estate asset managers' decision-making, providing a foundation for understanding the challenges and opportunities in aligning with the EU Taxonomy. The literature review will focus on real estate in Europe and specifically the Netherlands.

SQ 1	In the literature review the first sub-question: “What specific climate risks are relevant to existing real estate?” will be answered after the 3.1 subchapter.

Key points to be discussed include:

2.1 **Climate Risks and Their Impact on Real Estate**: Examines the types of physical and transitional risks impacting real estate and their consequences for asset management.

2.2 **Reporting Regulations: The European and Dutch Context:** Provides an overview of key reporting frameworks influencing sustainability practices in the real estate sector.

2.3 **EU Taxonomy and Its Relevance to Real Estate:** Analyses the Taxonomy’s objectives and criteria, emphasizing its role in climate adaptation and mitigation.

2.4 **Decision-Making in Real Estate Investment:** Explores how asset managers incorporate climate risks into their strategies, including enablers and barriers to compliance.

3.1 Climate Risks and Their Impact on Real Estate

There are several reasons based on climate risks for investors to transform their portfolio to make it more sustainable, research done by McKinsey & Company categorized physical and transitional risks, with indirect and direct risks related to climate risks (Boland et al., 2022):

3.1.1 Physical Risks

The main climate risks that could affect real estate are examined next. The direct risks range from accelerating physical consequences of climate change, such as storms, floods, fires, and extreme heat, are becoming more evident, leading to a significant risk of mispricing real estate across markets and asset classes. Increased maintenance costs and more investment required to improve the resilience of buildings. The indirect decline in demand because of accessibility being hampered by nearby area destruction and the increased risk for the insurer will result in higher insurance costs.

3.1.1.1 Flooding

Flooding poses a significant threat to real estate assets, particularly in coastal and low-lying areas. According to a report by the European State of the Climate (ESOTC) in 2023, there has been a 7% increase in rainfall, with one third of rivers having a high flood risk and 16% having a severe flood risk. Major floods occurred in Italy, Germany, Norway, Sweden, Greece and Slovenia in 2023, which shows the danger of floods in Europe. The frequency and severity of flooding events have increased in recent decades, driven by factors such as sea-level rise and changing precipitation patterns. Floodings are the costliest climate risk, adding up to 81% of the total economic loss because of the climate.

The link between flood risk, insurance, flood adaptation, and property value are crucial for maintaining commercial property value. While discounting due to flooding is observed but not

universally applied, market value relies on risk perception influenced by recent flood experiences. However, there are challenges in valuing commercial properties due to the lack of a consistent approach and the heterogeneity in the sector. A cost-based approach considering estimated damage, insurance costs, and compliance with codes can be helpful, but caution is necessary due to changing risk designations.

Government regulations promoting flood insurance uptake and improved hazard mapping can benefit commercial property markets. Investing in professional development for real estate professionals is crucial to address the lack of risk awareness. Flood adaptation measures and effective flood insurance conditions can help maintain property value and ensure funds during recovery (Lamond et al., 2019).

Inland flooding in the Netherlands, which stems from rivers like the Rhine and Meuse overflowing their banks, poses significant risks, particularly in low-lying areas such as Limburg and regions along major rivers. The probability of such flooding events has increased due to climate change, which causes more frequent and intense periods of rainfall, leading to higher river discharges. For instance, peak flows in the Rhine and Meuse are expected to rise, further elevating flood risks despite current protective measures.

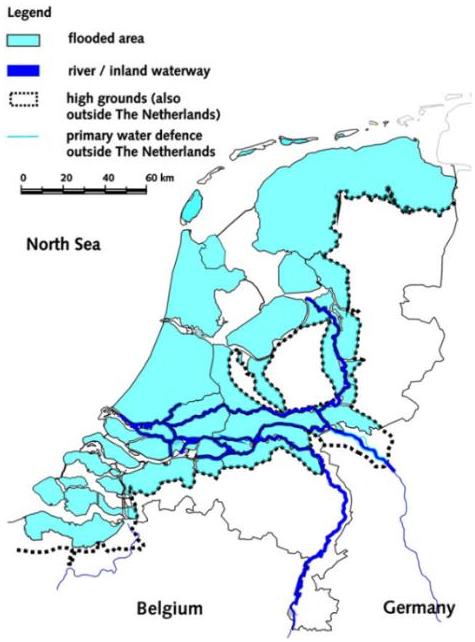


Figure 2: Flood-prone areas in the Netherlands. (Jonkman et al., 2008)

3.1.1.2 Storms and Extreme Weather Events

Storms are a primary cause of flooding in many European countries. The European State of the Climate (ESOTC) 2023 report highlights that severe storms have led to widespread flooding across Europe. Countries such as Norway, Italy, and Greece have experienced catastrophic flooding events, resulting in substantial property damage and loss of life.

Extreme weather events, including storms with high winds, can cause extensive damage to buildings. Roofs can be torn off, windows shattered, and exterior walls compromised. The 2020 Ciara and Dennis storms in the UK and across Europe showed the destructive power of high winds, resulting in widespread damage to residential and commercial properties. According to the Association of British Insurers (ABI), Storm Ciara alone led to insurance claims exceeding £560 million (ABI, 2020). The impact of wind damage goes beyond immediate repairs. Properties in wind-prone areas may face higher insurance premiums and increased maintenance costs, reducing their attractiveness to investors.

The increased frequency of extreme weather patterns has been observed over recent decades and is expected to continue, amplifying risks to both urban and rural areas. In the Netherlands, heavy rainfall can overwhelm drainage systems, leading to localized flooding that disrupts transportation, damages buildings, and can severely impact economic activities in urban centres. For example, the summer floods of 2021 in the Limburg region were partly caused by extreme rainfall, which also affected neighbouring countries like Germany and Belgium. The economic damage in the Netherlands from this event reached around €383 million (Pot et al., 2024).

The coastal areas of the Netherlands face heightened risks from windstorms originating over the North Sea, which can cause significant damage to nearby real estate. These storms bring strong winds that can impact buildings and infrastructure, particularly in urban centres along the coastline, leading to potential structural damage and increased maintenance costs (European Environment Agency, 2024).

3.1.1.3 Sea-Level Rise and Coastal Erosion:

As sea levels rise, coastal properties are increasingly at risk of flooding and erosion, making them less desirable to potential buyers and tenants. This decreased desirability can lead to a reduction in property values. With the heightened risk comes an inevitable increase in insurance premiums. Insurers are recalculating risks associated with coastal properties, leading to higher costs for property owners. The European Insurance and Occupational Pensions Authority (EIOPA) has noted a trend towards increasing premiums for properties in high-risk areas (EIOPA, 2022).

Beyond property values and insurance implications, sea-level rise and coastal erosion directly threaten the physical integrity of buildings and infrastructure. Coastal erosion can lead to land loss, undermining foundations and increasing the risk of structural failure. This physical risk translates into economic risk (DeLoss, 2022).

3.1.1.4 Thermal climate risks:

In addition to flooding, storms, and sea-level rise, other climate hazards such as wildfires, heatwaves, and droughts create challenges for real estate. In 2023 over 5000 square km was burnt during wildfires, the average temperature was 1,02-1,12 degrees warmer than average (ESOTC, 2023). The moisture of the soil was lower than average during dry periods and slightly higher during wet periods. The lack of moisture increases the risk of floods because the water can’t seep into the ground.

The increasing frequency and severity of heatwaves have prompted a shift in the way people consider where to live and invest in real estate. Buildings that are not adequately equipped to deal with the increasing heat and possible heatwaves risk losing value and future tenants. The combination of these climate risks emphasizes the necessity of all-encompassing approaches to strengthen assets and make wise choices about real estate investments.

In the Netherlands thermal climate risks are a big concern due to the density of the urban areas. The urban heat island effect increases the thermal risks, making cities like Amsterdam, Rotterdam, and Utrecht more vulnerable to extreme temperatures compared to rural areas (van Hove et al., 2011). For example, studies have shown that the urban heat island effect can cause temperature differences of up to 7°C between urban and rural areas in the Netherlands (Heusinkveld et al., 2014). This intensifies the pressure on buildings, particularly office real estate because workers are primarily inside during the warmer periods of the day.

3.1.1.5 Subsidence risk:

Subsidence, the gradual sinking or settling of the ground's surface, poses a significant risk to real estate worldwide, especially in areas with soft soils, groundwater extraction, and fossil fuel extraction activities. This phenomenon can result in substantial damage to buildings and infrastructure, leading to increased maintenance costs, decreased property values, and heightened vulnerability to other risks like flooding (UNEP FI, 2023) source.

Subsidence typically occurs due to natural processes such as the compaction of soft sediments, as well as human activities like groundwater extraction, mining, and oil and gas production. For example, in urban areas built on soft soils, like clay or peat, the ongoing drainage of water can cause these soils to compact and shrink, leading to a gradual but sustained lowering of the ground surface. This can damage building foundations, cause cracks in walls and floors, and even result in the tilting or collapse of structures over time (Stouthamer et al., 2020).

Real estate in the Netherlands is particularly vulnerable to these subsidence effects due to the extensive urbanization on soft, organic-rich soils like peat and clay. Many buildings in the low-lying western and northern parts of the country, including critical economic hubs such as Amsterdam and Rotterdam, are affected by ground settling. This can cause structural damage to office buildings, residential properties, and other infrastructure, leading to increased maintenance and repair costs.

The subsidence process is largely driven by human activities such as the drainage of peatlands, expansion of urban areas, groundwater extraction but also by climate change. Climate change influences soil moisture levels through altered precipitation patterns and sea-level rise, accelerating land sinking. Droughts lower groundwater levels, increasing subsidence, while rising seas increase pressure on coastal soils, leading to further compaction and land sinking in vulnerable area. These factors have contributed to subsidence rates ranging from 0.5 to 10 cm per year in some regions, creating risks for buildings and infrastructure across the country (UNEP FI, 2023).

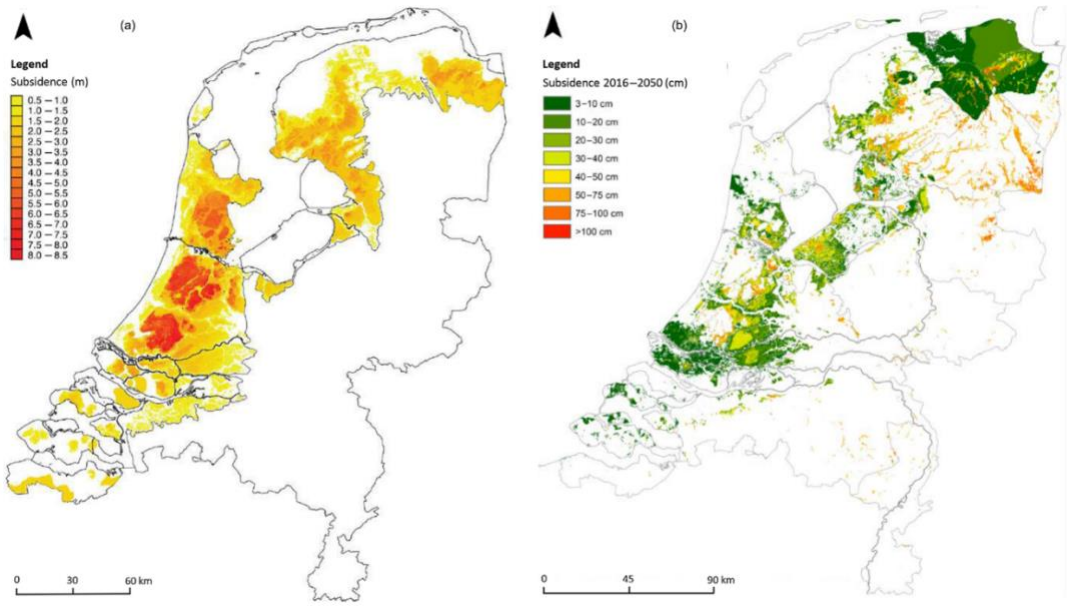


Figure 3: Subsidence-prone areas in the Netherlands. (Stouthamer et al., 2020)

Damage costs associated with subsidence-related infrastructure issues are projected to exceed €5 billion by 2050, impacting both property owners and local governments responsible for maintaining public infrastructure. Additionally, subsidence can increase the risk of flooding in areas where sinking ground levels reduce the effectiveness of water management systems, further complicating the management of real estate assets in these regions.

The economic impact of subsidence on real estate is considerable. Studies have shown that areas with significant subsidence can experience a decrease in property values due to the perceived and actual risks associated with structural instability (Jansen, 2023). Repairing subsidence-related damage often involves complex and costly interventions, such as underpinning foundations or stabilizing soil conditions.

3.1.2 Transition Risks:

Transition risks refer to the challenges and uncertainties that come up as the economy shifts toward a lower-carbon future, impacting the real estate sector in multiple ways. These risks are driven by evolving regulations, market dynamics, technological advancements, and changing stakeholder expectations, all aimed at reducing carbon emissions and promoting sustainability.

For real estate, transition risks can include stricter building codes, new energy efficiency standards, and increased pressure from investors and tenants to meet sustainability criteria. The need to comply with frameworks like the EU Taxonomy and local energy performance regulations can lead to increased costs for upgrading building systems or retrofitting older properties.

Additionally, failure to meet these standards can result in a loss of market competitiveness and diminished asset values. As the real estate sector adapts to these changes, understanding and managing transition risks becomes critical to maintaining the financial performance and long-term viability of properties.

3.1.2.1 Regulation and policy pressure:

The real estate sector faces significant climate transition risks driven by increasing regulation and policy pressures. These risks come from the global push to decarbonize the economy and achieve climate targets, such as those outlined in the Paris Agreement, which aims to limit global warming to 1.5°C above pre-industrial levels. For the real estate sector, aligning with these goals means substantial reductions in greenhouse gas (GHG) emissions, improved energy efficiency, and compliance with new reporting and sustainability standards (UNEP FI, 2023).

In Europe, the European Union's policies place direct pressure on real estate investors and asset managers to integrate climate risks into their investment strategies. The EU Taxonomy further specifies which activities qualify as environmentally sustainable, setting benchmarks for energy performance and carbon emissions reductions. These regulations require real estate stakeholders to not only disclose their environmental impacts but also actively work towards reducing their carbon footprints (European Commission, 2024).

In the Netherlands, office real estate is under increasing regulatory and legislative pressure. The Dutch National Energy Agreement is a crucial regulatory framework that requires all office buildings to reach at least Energy Label C by 2023 or cease to be legally useable for commercial purposes (RVO, 2018). This regulation has a direct impact on asset managers, who must spend in energy-efficiency modifications to maintain compliance. Looking ahead, Dutch regulators have set even more ambitious targets, requiring all office buildings to meet Energy Label A standards by 2030.

Failing to adapt to these changing regulatory requirements can result in several risks for real estate stakeholders, including reduced market attractiveness, potential asset devaluation, and stranded assets.

3.1.2.2 Shifting market preference:

As climate awareness increases, market preferences in the real estate sector are shifting towards more sustainable and resilient properties. Investors, tenants, and regulators are increasingly prioritizing buildings with lower carbon footprints, higher energy efficiency, and robust climate adaptation measures. This shift is driven by the recognition that properties better equipped to handle climate risks are more likely to retain their value and attract higher-quality tenants (Mangialardo, Micelli & Saccani, 2018).

For real estate stakeholders, this shift represents a critical transition risk. Properties that fail to meet evolving market expectations, such as those lacking green certifications or resilient design features, risk becoming less attractive. This could lead to lower occupancy rates, declining property values, and reduced rental income as tenants opt for buildings that align with their own sustainability goals. As companies and institutions adopt net-zero commitments, they increasingly seek buildings that support their sustainability strategies, further amplifying the demand for climate-friendly real estate (Katafygioutou, Protopapas & Dimopoulos, 2023).

3.1.2.3 Change in investor sentiment:

Investor sentiment in the European real estate market has evolved significantly, with a growing emphasis on sustainability and climate adaptation. This shift reflects a preference for assets that adhere to environmental, social, and governance (ESG) standards, aligning with long-term climate objectives. Important factors driving this change include increased regulatory requirements, shifting tenant expectations, and a recognition that ESG-compliant buildings are better positioned to retain value in the face of rising climate risks (PWC, 2023).

In markets like Germany, France, and the UK, there is a notable trend towards retrofitting existing buildings to enhance their energy efficiency and resilience rather than focusing on new construction (PWC, 2023). These efforts are not only aimed at reducing carbon footprints but also at making properties more attractive to tenants seeking sustainable spaces. This shift is also evident in the Netherlands, where investors prioritize properties that demonstrate robust resilience to climate-related risks, such as flooding and intense weather conditions (Savills, 2024).

3.1.2.4 Reputational risk:

Climate awareness continues to affect market dynamics and stakeholder expectations, making reputational risk an important concern for the commercial real estate sector. Investors, tenants, and regulators are increasingly expecting real estate companies to make significant commitments to sustainability and climate adaption. Failure to meet these expectations can lead to considerable reputational damage, affecting a company's market position, investor interest, and long-term profitability (UNEP FI, 2023).

Furthermore, the EU Taxonomy and other regulatory requirements mandate greater transparency around climate adaptation efforts, compelling real estate stakeholders to disclose their strategies for managing climate risks. This transparency is critical, as failing to meet these standards can harm a company's public image and make it less attractive to both investors and tenants.

SQ 1	**What specific climate risks are relevant to existing real estate?** Climate risks in real estate can be categorized into physical risks and transition risks, both of which have financial and operational implications for asset managers. Physical risks include flooding, storms, extreme heat, sea-level rise, and subsidence. Flooding is particularly severe, with rising rainfall and sea levels increasing exposure, especially in low-lying areas like the Netherlands (Copernicus Climate Change Service, 2024). Storms cause structural damage, raising insurance costs and maintenance expenses (ABI, 2020), while extreme heat impacts indoor working conditions, making adaptation measures essential (Heusinkveld et al., 2014). Coastal erosion and subsidence further threaten property stability, reducing long-term investment security (EIOPA, 2022; Stouthamer et al., 2020). Transition risks stem from evolving regulations and changing market expectations. Policies such as the EU Taxonomy, SFDR, and CSRD require compliance with sustainability standards, pushing asset managers to invest in energy-efficient upgrades (European Commission, 2024). Failure to meet these requirements can lead to asset devaluation and regulatory penalties (PwC, 2023). Market trends also show a growing preference for sustainable properties, with higher demand for energy-efficient buildings, while older, non-compliant properties risk losing tenants and market value (Savills, 2024). Additionally, reputational risks play a role, as investors and tenants increasingly expect real estate firms to integrate sustainability into their portfolios. Companies that fail to do so face reduced market appeal, funding challenges, and increased scrutiny from stakeholders (UNEP FI, 2023). As climate risks intensify and regulations tighten, proactive adaptation becomes essential for maintaining asset value and investment stability.

3.2 Reporting Regulations: The European and Dutch Context

The regulatory landscape in Europe and the Netherlands has changed significantly, with sustainability becoming a central focus for both businesses and investors. These regulations aim to ensure transparency and accountability in how companies assess and report on sustainability. This chapter looks at the current European and Dutch regulations relevant to real estate.

3.2.1 European Context

The European Union has set high targets to combat climate change and promote sustainability, with the European Green Deal serving as the centre of its plan. The Green Deal, introduced in 2019, defines the EU's aim to being climate neutral by 2050, making Europe the first continent to do so. To achieve this goal, the Green Deal combines a wide range of policies and regulations targeted at lowering greenhouse gas emissions, increasing energy efficiency, and promoting long-term economic growth (European Commission, 2024).

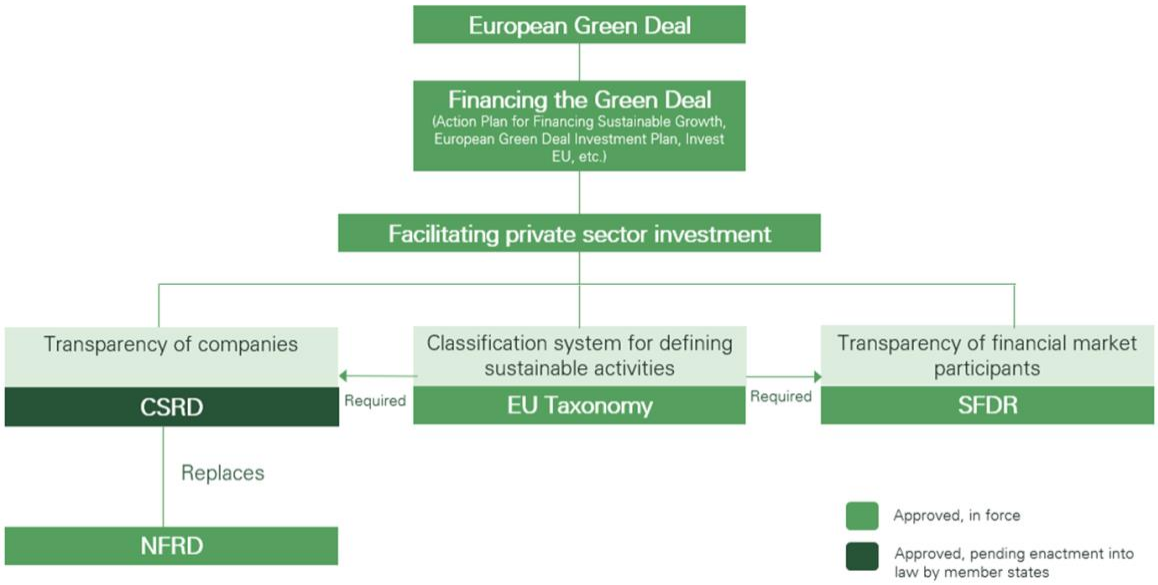


Figure 4: Classification of the different reporting policies in the EU (Onetrust, 2024).

The European Green Deal builds on previous global and European sustainability agreements. The Kyoto Protocol (1997), in which industrialised countries agreed to reduce greenhouse gas emissions, serves as the foundation for modern sustainability measures. While the Kyoto Protocol set the basis, it was succeeded by the Paris Agreement (2015), which brought together global efforts to restrict global temperature rise to less than 2°C, with the goal of staying below 1.5°C (UNFCCC, 2015). The Paris Agreement marked a turning point for the EU, requiring it to improve its sustainability targets and policies to achieve long-term climate resilience.

Sustainability frameworks formed because of initiatives like as the Europe 2020 Strategy, which emphasised smart, sustainable, and equitable growth while also setting targets for decreasing greenhouse gas emissions, expanding renewable energy use, and improving energy efficiency (European Commission, 2010).

In 2018, the EU launched the Clean Energy for All Europeans Package, which focusses on energy efficiency and encourages the renovation of Europe's ageing building stock to cut emissions and energy consumption. Buildings, including real estate, play a crucial role in meeting climate targets, accounting for about 40% of energy consumption and 36% of CO_2 emissions in the EU (European Commission, 2019).

The introduction of the European Green Deal in 2019 took these efforts further, setting legally binding climate neutrality targets and implementing a coordinated strategy to integrate sustainability into all economic sectors, including real estate. The Green Deal emphasizes the importance of clear and measurable sustainability reporting, leading to the development of key frameworks like the EU Taxonomy, SFDR (Sustainable Finance Disclosure Regulation), and the CSRD (Corporate Sustainability Reporting Directive) (European Commission, 2020).

Year	Agreement/Framework	Purpose
1997	Kyoto Protocol	Established binding emission reduction targets for industrialized nations.
2010	Europe 2020 Strategy	Set targets for GHG emission reductions (20%), renewable energy share (20%), and energy efficiency improvement (20%).
2015	Paris Agreement	A global agreement to limit temperature rise to below 2°C, pushing EU to revise its climate and energy targets.
2018	Clean Energy for All Europeans Package	A package of legislation promoting energy efficiency, including the Energy Performance of Buildings Directive (EPBD).
2019	European Green Deal	Introduced a comprehensive strategy for achieving climate neutrality by 2050 and launched key reporting frameworks.

Table 2: The previous and current frameworks & agreements to reach climate neutrality (own work).

Below are examples of key regulations and frameworks stemming from or associated with the European Green Deal. While the European Green Deal is a broad policy initiative rather than a single regulation, it contains multiple legislative acts and strategies. The tables below list selected measures (European Commission, 2024):

Regulation/Framework	Purpose	Date of obligation	Who?
Energy Performance of Buildings Directive (**EPBD**)	Improve energy efficiency, reduce GHG emissions in buildings, and establish minimum performance standards and certification.	Original directive (2010/31/EU) in force since 2010 recast in 2018 Future revisions under the Fit for 55 package are ongoing.	EU Member States, building owners, developers, landlords.
Energy Efficiency Directive (**EED**)	Set energy efficiency targets, require energy audits for large firms, and promote efficient building renovations.	Original EED (2012/27/EU) in force since 2012, revised in 2018. Further amendments under Fit for 55 will apply after adoption (expected from 2024-2025 onwards).	EU Member States, large companies, building owners.
Renewable Energy Directive (**RED II**)	Increase the share of renewable energy, including integrating renewables in buildings (e.g., solar).	RED II (2018/2001/EU) in force since 2018, Member States had to adapt by June 2021. Further revisions under Fit for 55 underway.	EU Member States, indirectly building sector (e.g., for new construction standards).
EU Taxonomy Regulation	Classify sustainable economic activities, including sustainable building construction and renovation.	Climate-related criteria apply from January 2022, other environmental objectives from January 2023.	Financial market participants, large companies under NFRD/CSRD; for green finance or those subject to ESG reporting.
Sustainable Finance Disclosure Regulation (**SFDR**)	Improve transparency on ESG integration in financial products, including real estate investment funds.	In effect from March 2021, subsequent regulatory technical standards phased in from January 2023.	Asset managers, financial advisers, investment funds (including real estate funds).
Corporate Sustainability Reporting Directive (**CSRD**)	Expand scope and detail of sustainability reporting, including building energy use and climate impact.	From January 2023, reporting obligations start in 2024 (for large public-interest entities), gradually extending to other companies until 2029.	All large and listed EU companies, including real estate firms meeting thresholds.

European Climate Law	Legally binds EU to climate neutrality by 2050 and sets intermediate targets, indirectly influencing building policies and standards.	Since July 2021; implementation occurs through sectoral legislation and targets.	EU Institutions, Member States; indirect obligations for real estate as building standards evolve in line with climate goals.
Corporate Sustainability Due Diligence Directive (**CSDDD**)[1]	Ensure companies identify and mitigate environmental and human rights risks in their supply chains	Expected to enter into force in coming years	Large companies, including large real estate developers/managers
Waste Framework Directive (**WFD**)[1]	Sets principles and targets for waste management, incl. construction waste	Since 2008 (Directive 2008/98/EC)	Member States; affects construction and demolition waste handlers in real estate
Fit for 55 Package	A legislative package to align EU climate & energy laws with a 55% emissions reduction by 2030.	Proposed in July 2021; updates to EPBD, EED, RED, and other directives are phased as adopted.	EU Member States; indirectly all building owners, developers, and operators due to tighter standards.

Table 3: All regulations and frameworks that fall under the European Green Deal (own work).

[1] The CSDDD and WFD, though not originally listed with the Green Deal, are aligned with the EU's broader sustainability objectives and can impact real estate operations.

[2] Fit for 55 is a package of proposals under the European Green Deal rather than a single directive or regulation. It drives revisions of existing directives that directly affect the real estate sector (EPBD, EED, RED II).

3.2.2 Dutch Context

With the European Union's increasing focus on sustainability, the Netherlands began to adjust its building regulations to comply with EU directives. One of the most important drivers was the Energy Performance of Buildings Directive (EPBD), first introduced in 2002 and later recast in 2010 and 2018 (European Parliament & Council, 2010, 2018). This directive pushed EU Member States, including the Netherlands, to introduce stricter energy performance requirements, energy certification schemes, and regular inspections of heating and cooling systems.

In response, the Netherlands introduced the Energy Performance Coefficient (EPC) as a measure of a building's energy efficiency. Over time, the EPC requirements became more strict, encouraging developers and owners to build and renovate more energy-efficient properties. Eventually, EPC requirements gave way to Nearly Zero-Energy Building (BENG) standards, which came into effect on January 1, 2021 (RVO, 2017). BENG sets even lower energy consumption thresholds, making new buildings far more sustainable.

Around the same time, the government also made displaying an Energy Label mandatory whenever a building is sold or rented. This Energy Label shows buyers and tenants how energy-efficient a property is (RVO, 2017) Later, the government introduced a new rule: by January 1, 2023, all office buildings larger than 100 square meters had to have at least an energy label C (RVO, 2018) If they did not meet this requirement, they could no longer be rented out as office space. The government strives to reach an average Energy Label of A in the built environment, although this is not mandatory for offices.

In addition to the regulations for new buildings and existing building operations, the Netherlands has introduced a framework to guide the renovation of older properties toward higher energy efficiency. Known as the "Renovatiestandaard," this standard aims to bring existing buildings closer to future energy and climate targets, ensuring that the Dutch building stock can meet long-term sustainability goals in line with national and EU commitments (RVO, 2023).

Additional regulations include the Environmental Management Act (Wet Milieubeheer), which obliges owners of large energy-consuming buildings (over 50.000 kWh and/or 25.000 m^3 gas) to implement all energy-saving measures with a payback time of five years or less (RVO, 2022). This law ensures that cost-effective measures to improve energy efficiency are not neglected.

Below are several key regulations and frameworks relevant in the Dutch built environment. The tables below list selected (RVO, 2024., Rijksoverheid, 2012):

Regulation / Framework	Purpose	Date of Obligation	Who is Obligated
Bouwbesluit (Dutch Building Decree)	Sets minimum quality, health, and safety standards for buildings; increasingly includes energy performance requirements.	Continuous updates since its introduction, energy performance integrated over time.	Developers, building owners, and contractors.
Energy Performance Coefficient (EPC) (now replaced by BENG)	Measures energy efficiency of buildings, setting a maximum allowed value.	Became stricter over time, replaced by BENG from Jan 1, 2021.	Developers, building owners of new constructions.
Nearly Zero-Energy Buildings (BENG)	Ensures very low energy consumption in new buildings.	Mandatory for all new buildings from Jan 1, 2021.	Developers, building owners of new constructions.
Energy Label (Energielabel)	Requires building owners to have an energy label at sale, rent, or completion.	Mandatory since 2008; stricter enforcement since 2015.	Building owners, sellers, and landlords.
Energy Label C Requirement for Offices	All offices >100 m^2 must have at least label C.	Mandatory from Jan 1, 2023.	Owners of office buildings.
Environmental Management Act (Wet Milieubeheer)	Requires large energy users to implement cost-effective energy-saving measures.	Ongoing; must comply as long as energy use exceeds threshold.	Owners of buildings with high energy usage.

Table 4: All regulations and frameworks relevant in the Netherlands (own work).

Overall, Dutch real estate companies must now comply with several layers of rules. Some come directly from the EU and are integrated into Dutch law. Others are purely national initiatives. The main trend, however, is clear: real estate stakeholders face increasingly strict requirements to make buildings more energy-efficient, sustainable, and climate-friendly.

3.3 EU Taxonomy and Its Relevance to Real Estate

3.3.1 EU Taxonomy

The EU Taxonomy aims to guide investors, financial institutions, and companies in identifying which investments and activities contribute to environmental sustainability. It is not a certification system or regulation for construction quality. The transparency is essential for preventing greenwashing, where companies falsely claim to be environmentally friendly, and ensures that financial flows are directed toward genuinely sustainable projects. Furthermore, the EU Taxonomy is part of the broader European Green Deal and supports the transition toward a climate-neutral economy by 2050.

The EU Taxonomy consists of six environmental objectives, which serve as the foundation for determining whether an activity qualifies as environmentally sustainable. These objectives are:

1. **Climate Change Mitigation**: Activities must help to stabilize or reduce greenhouse gas emissions in line with the objectives of the Paris Agreement.
2. **Climate Change Adaptation**: Activities should enhance resilience to the adverse effects of climate change and prevent or minimize damage from climate-related risks, such as floods and droughts.
3. **Sustainable Use and Protection of Water and Marine Resources**: Activities must contribute to sustainable water management and protection of aquatic ecosystems.
4. **Transition to a Circular Economy**: This includes activities that reduce waste, promote resource efficiency, and encourage recycling and reuse.

5. **Pollution Prevention and Control**: Activities should aim to avoid, reduce, or control environmental pollution, including air, water, and soil pollution.
6. **Protection and Restoration of Biodiversity and Ecosystems**: Activities must safeguard biodiversity and ecosystems, supporting nature's ability to regenerate and maintain its functions.

To qualify as environmentally sustainable under the EU Taxonomy, an activity must substantially contribute to at least one of these objectives without doing significant harm to any of the others (European Commission, 2024).

Under the EU Taxonomy, real estate asset managers and companies must comply with several key regulatory frameworks to ensure transparency in their sustainability practices. These frameworks include the Sustainable Finance Disclosure Regulation (SFDR) and the Corporate Sustainability Reporting Directive (CSRD). These frameworks establish reporting obligations for companies, these obligations are set out in the Disclosures Delegated Act.

It is necessary to separate the EU Taxonomy from construction regulations and environmental certification programs. While the Dutch Bouwbesluit and BREEAM-NL evaluate technical construction quality and environmental performance, the EU Taxonomy is a financial classification tool. Its primary audience is the financial sector, not developers or contractors, and the criteria are designed to direct resource allocation rather than establish design standards. The EU Taxonomy itself is also not a climate risk assessment tool, but it does require organisations to demonstrate that their economic activities effectively reduce exposure or vulnerability to physical climate risks. This creates a way for investors to demonstrate that they are actively investing in sustainability.

3.3.1.1 Sustainable Finance Disclosure Regulation (SFDR)

The Sustainable Finance Disclosure Regulation (SFDR), introduced in 2019 and effective since March 2021, is an important part of the European Union's strategy for promoting transparency and accountability in sustainable finance. The SFDR aims to standardize ESG (Environmental, Social, and Governance) disclosures across financial market participants and products, including real estate investment funds, thereby fostering sustainable investment practices while reducing the risks of greenwashing (Plana, 2023).

The SFDR requires financial institutions to provide clear and comparable information on how they integrate sustainability risks and objectives into their operations. Compliance with the SFDR is monitored by national financial market authorities in each Member State, such as the Dutch Financial Market Authority (AFM) in the Netherlands. Additionally, the SFDR's alignment with the EU Taxonomy and its reliance on regulatory technical standards (RTS) further strengthen enforcement. The RTS, which came into effect in 2023, standardizes the format and content of disclosures, ensuring that all market participants report comparable information (Loyens & Loeff, 2023).

Real estate companies operating under the SFDR must ensure that their investment activities and disclosures align with the regulation's goals. The most important requirements for real estate investors are shown in the table below (Regulation (EU) 2019/2088, 2019):

Type	Details
Disclosure of Sustainability Risks	Real estate asset managers must disclose how sustainability risks, such as climate change, are incorporated into their investment decisions. This includes reporting the financial impacts of risks like flooding, heatwaves, or energy inefficiency on property portfolios (Plana, 2023).
Categorization of Financial Products	Real estate investment products must be classified under the following SFDR categories (Loyens & Loeff, 2023): - **Article 6:** Products that do not integrate sustainability considerations or do so minimally.

	- **Article 8:** Products promoting environmental or social characteristics. - **Article 9:** Products with sustainability as their core objective, such as funds investing in green buildings or renewable energy infrastructure.
Principal Adverse Impacts (PAI)	Companies must report on the Principal Adverse Impacts of their investment activities on ESG factors. For real estate investors, PAIs could include metrics such as greenhouse gas emissions, water usage, or the energy performance of buildings. These disclosures enhance transparency and accountability.
Alignment with the EU Taxonomy	Financial products classified under Articles 8 and 9 must comply with the EU Taxonomy. This involves meeting specific criteria for environmental sustainability, including substantial contributions to climate adaptation and mitigation, and adhering to the "Do No Significant Harm" (DNSH) principle.
Transparency of ESG Objectives	The SFDR requires detailed disclosures of ESG objectives:- Article 8 products: How environmental or social characteristics are promoted.- Article 9 products: Measurable sustainability goals, such as achieving net-zero carbon emissions across a real estate portfolio by a specific date.

Table 5: Most important requirements for the SFRD for real estate investors (own work, derived from Directive 2019/2088, 2019).

3.3.1.2 Corporate Sustainability Reporting Directive (CSRD)

The CSRD, which replaced the NFRD in 2024, significantly expands the scope of companies required to disclose sustainability information. Under the CSRD, The CSRD requires companies to report on their environmental, social, and governance performance through a standardized framework that aligns with the EU Taxonomy. The directive introduces the concept of double materiality assessments (DMA), where companies must disclose both how sustainability issues impact their financial performance (outside-in perspective) and how their operations impact the environment and society (inside-out perspective). This dual focus ensures a comprehensive approach to corporate responsibility (Directive (EU) 2022/2464, 2022).

The CSRD applies to a much broader range of companies than the NFRD, encompassing listed small and medium-sized enterprises (SMEs), large unlisted companies, and financial market participants, such as real estate asset managers. Compliance will be phased in, starting in 2024, with companies already subject to the NFRD, and expanding to include other entities by 2026.

Type	Details
Expanded Scope of Reporting	Real estate companies that previously fell outside the NFRD's scope must now comply with CSRD requirements, including those managing smaller or unlisted portfolios. This expansion ensures that a broader range of real estate assets is subject to sustainability scrutiny.
Standardized Reporting Frameworks	The introduction of ESRS ensures that real estate companies provide uniform data on ESG performance, enabling investors and stakeholders to compare sustainability outcomes across different portfolios.
Alignment with EU Taxonomy	Companies must align their reporting with the EU Taxonomy, which defines sustainable economic activities. For real estate, this includes investments in energy-efficient buildings, climate adaptation measures, and renewable energy projects.
Double Materiality	Real estate companies must assess and report both how climate risks affect their financial performance (e.g., asset depreciation due to flooding) and how their activities impact environmental and social systems (e.g., carbon emissions from building operations).

Table 6: Most important requirements for the CSRD for real estate investors (own work, derived from Directive 2022/2464, 2022).

3.3.2 Substantial Contribution Criteria

The EU Taxonomy Contribution Criteria serve as a framework for assessing and aligning economic activities with climate adaptation goals. Activities are categorized in different sectors of the EU Taxonomy. Each economic activity could be aligned with climate mitigation, climate adaptation, water, circular economy, pollution prevention and biodiversity. Only the relevant alignments will be discussed, these are the points that become relevant when implementing climate risk measures. The economic activities that are discussed are those relevant to renovation on real estate.

Each economic activity has the same minimum safeguards. According to these safeguards the economic activity must align with (European Commission, 2024):

1. **OECD Guidelines for Multinational Enterprises**: these guidelines provide principles and standards for responsible business conduct in areas such as human rights, employment, environment, and anti-corruption. Companies are expected to implement procedures that ensure their activities are aligned with these guidelines (OECD, 2023).
2. **UN Guiding Principles on Business and Human Rights:** Companies must respect human rights as outlined in the UN principles. This involves conducting due diligence to identify, prevent, mitigate, and account for how they address their human rights impacts (UN, 2024).
3. **International Labour Organisation (ILO) Conventions**: Companies must adhere to the eight fundamental conventions of the ILO, which include key principles on labour rights, such as the prohibition of forced labour, child labour, and discrimination, and the right to collective bargaining.
4. **International Bill of Human Rights**: This includes the Universal Declaration of Human Rights, ensuring that business activities respect civil, political, economic, social, and cultural rights.
5. **'Do No Significant Harm' Principle**: In addition to adhering to the above standards, businesses must follow the principle of "do no significant harm," ensuring that their operations do not cause significant negative impacts on the environment, as outlined in *Article 2 of Regulation (EU) 2019/2088.*

3.3.3 Categories and Activities Relevant to Real Estate

Under the EU Taxonomy, real estate-related activities primarily fall within the “Construction and Real Estate Activities” category. This category directly covers activities such as the construction of new buildings, the renovation of existing buildings, and the operation of real estate assets (European Commission, 2024). However, the Taxonomy’s structure is not strictly limited to single categories for each project or investment. Some real estate-related projects may overlap with, or be influenced by, other categories, depending on the nature of the work and the measures being implemented.

The core category for real estate focuses on activities such as:

1. **Construction of New Buildings:**
   Activities that result in completed new structures must meet certain energy performance standards and climate objectives to qualify as environmentally sustainable. For example, new buildings may need to achieve nearly zero-energy standards or integrate low-carbon materials.

2. **Renovation of Existing Buildings:**
   Improving the energy efficiency, reducing greenhouse gas emissions, and enhancing climate resilience of existing buildings through renovation is a key area. Measures such as retrofitting insulation, upgrading heating and cooling systems, or installing energy-efficient windows can help buildings meet the criteria for climate change mitigation or adaptation.

3. **Acquisition and Ownership of Buildings:**
   Even the purchase and ongoing operation of buildings can be relevant, as these activities must demonstrate that the property meets or moves toward meeting performance thresholds. Property owners who invest in upgrades to meet the Taxonomy criteria can align their portfolio with long-term sustainability goals.

3.3.3.1 Overlapping categories

Real estate projects often touch on several economic activities. For example, a renovation might primarily focus on reducing energy consumption and emissions (Construction and Real Estate Activities, Energy categories) while also integrating features that support biodiversity (Environmental Protection and Restoration Activities) and improving water management systems. Because one project can align with multiple categories, companies must document how each element meets Taxonomy criteria. This thorough reporting helps investors and stakeholders understand the project's full range of environmental benefits. Such transparency is key to meeting the requirements of the Sustainable Finance Disclosure Regulation (SFDR) and Corporate Sustainability Reporting Directive (CSRD). Below are the main categories from the EU Taxonomy that are often relevant to real estate projects (European Commission, 2024):

1. **Energy:**
   If a building renovation includes the installation of solar panels, geothermal systems, or the integration of on-site energy storage, these aspects could fall under the Energy category.

2. **Environmental Protection and Restoration Activities:**
   Suppose the renovation involves adding green roofs, biodiversity-friendly landscaping, or measures that restore or protect local ecosystems. In that case, the activity might also relate to environmental protection and restoration categories. This would be especially relevant if the building site included areas for habitat restoration or green infrastructure that supports biodiversity.

3. **Water Supply, Sewerage, Waste Management and Remediation:**
   Real estate projects that improve water efficiency, install advanced water filtration systems, implement rainwater harvesting, or enhance wastewater treatment systems could fall under the water-related categories. Such measures support the Sustainable Use and Protection of Water and Marine Resources objective. For example, adding infrastructure that collects and reuses stormwater for irrigation aligns both with construction/renovation activities and with sustainable water management practices.

4. **Environmental Protection and Restoration Activities**
   Buildings and their surrounding areas can contribute to environmental protection and restoration. Including green roofs, native plant species, and wildlife-friendly landscaping helps support local ecosystems and increase urban biodiversity. If a building site contains or adjoins degraded ecosystems, real estate projects can incorporate measures to restore habitats, protect natural features, or create new green spaces that benefit local flora and fauna.

5. **Disaster Risk Management**
   Activities that enhance a building's resilience to natural disasters, such as floods, storms, heatwaves, or earthquakes, can also align with the Taxonomy's climate change adaptation objective. Elevating critical infrastructure, improving drainage systems, and constructing flood barriers can protect buildings from rising water levels. Reinforcing structures, using hurricane-proof windows, and strengthening roofs enhance a building's ability to withstand extreme weather events. Incorporating shading devices, reflective materials, or natural ventilation helps mitigate the effects of heatwaves and ensures occupant comfort and safety.

3.4 Decision-Making in Real Estate Investment:

Real estate investment involves complex decision-making processes influenced by a variety of factors such as location, risk perception, and the use of software tools to identify the best investment opportunities. This analysis will investigate real estate investors' decision-making processes, identifying barriers and enablers that influence their investment choices.

Real estate asset managers frequently use asset allocation models to determine the optimal allocation between asset classes based on performance and risk evaluations. However, decision-making is not solely governed by these models; it is influenced by factors other than numbers. The concept of risk plays an important role in decision-making under uncertainty, with the definition of risk within an asset allocation model frequently differing from the risk perception of the decision-maker (French, 2001).

Choosing the best location for real estate investment is a critical component of decision-making. Investors consider various criteria, such as public transportation, safety, business activity, and amenities, resulting in a complex decision-making process due to choice overload. The availability of software tools further influences decision-making by enabling users to compare investment opportunities (Kumar et al., 2021).

3.4.1 Enablers

Real estate investor decision-making is significantly influenced by a variety of external enablers that play a crucial role in shaping investment choices. Research by Andersson (2023) listed several enablers relevant for commercial real estate actors that engage in sustainability. These include the evolution of software tools, collaboration networks, climate change, recent crisis, external financing, regulation and policy.

- **Software tools:** The advancement of software tools has changed the real estate investment landscape by providing investors with the capability to analyse and identify optimal investment opportunities. These tools could use data science, machine learning, and statistical modelling to provide algorithms and methods to help with decision-making processes (Kumar et al., 2021).

- **Collaboration networks:** Collaboration networks play a great role in real estate investment decision-making. Investors often leverage professional networks, industry collaborations, and partnerships to gain information into emerging trends, market opportunities, and innovative investment strategies. These networks enable investors to access valuable information.

- **Climate change:** The focus on climate change, as well as the growing emphasis on environmental, social, and governance (ESG) criteria, are influencing real estate investor decisions. Government regulators are creating laws and ordinances governing the performance and disclosure of real estate assets based on ESG standards. These requirements require real estate investors to track and report on their investment decisions. This encourages investors to focus more on environmental projects to differentiate themselves as a company and meet ESG standards.

- **Recent crisis:** Recent climate events and European reports highlight the potential impact of climate risks on investors' portfolios. According to Krueger et al. (2019), institutional investors are aware of climate risks and are implementing risk management strategies, but the overall picture of total climate risks is unknown. Knowing that climate events will become more frequent because of climate change enables investors to focus on the adaptability of their investments or thoroughly assess the climate risks of their investments.

- **Regulatory and policy:** Regulation and policy at different levels significantly impact real estate investor decision-making. The regulatory landscape, particularly in response to climate change and sustainability requirements, is driving changes in investment strategies and asset evaluation. These policy changes can help investors make decisions, but they can also be a barrier because they are unpredictable, creating uncertainty when making decisions.

3.4.2 Barriers

Real estate investors' decisions are influenced by a variety of barriers that can have a significant impact on investment options and strategies. These barriers include difficult location identification, misaligned risk perceptions, market uncertainties, regulatory challenges, and financial constraints. Understanding these barriers is important for developing effective investment strategies and risk management approaches.

- **Complexity of location identification:** The complexity in choosing the best investment location is a significant barrier for real estate investors. With so many factors influencing location decisions, such as proximity to amenities, transportation connectivity, demographic trends, and economic indicators, investors frequently face decision-making challenges due to the sheer number of variables to consider. This complexity is especially evident in large cities and rapidly growing urban areas, where diverse characteristics and dynamic market conditions make it difficult to identify consistent investment opportunities (Kumar et al., 2021).

- **Misaligned risk perceptions:** The misalignment between the risk perception embedded in asset allocation models and the risk perception of investors creates a significant barrier to real estate investor decision making. While asset allocation models use mathematical parameters and historical data to assess risk, investors' subjective risk perceptions may vary due to individual risk desires, market sentiments, and qualitative factors that traditional risk assessment models do not fully capture.

  This misalignment can cause variations in investment decisions based on different risk interpretations, impeding the development of consensus strategies and reducing the efficiency of investment decision-making processes (French, 2001).

- **Market Uncertainties:** Market uncertainties, including economic volatility, geopolitical risks, and disruptive events such as the global pandemic, pose substantial barriers to real estate investor decision-making.

- **Regulatory Challenges:** Regulatory challenges at different levels present barriers to real estate investor decision-making. Changing regulations related to land use, environmental impact assessments, zoning laws, and building codes can introduce complexities and compliance burdens for real estate investments. Changes in tax policies, sustainability requirements, and energy efficiency standards further impact investment strategies and asset evaluations, requiring investors to constantly change their decision-making process.

- **Financial Constraints:** Financial constraints, including capital availability, financing costs represent significant barriers to real estate investor decision-making. Access to external financing, debt markets, and equity sources can influence investment choices, particularly during periods of economic downturns. Climate adaptation investments do not directly translate into financial gain, making investors less likely to invest in such measures if the budget is tight and the risk is low.

3.4.3 Institutional Pressures

The decision to align with the EU Taxonomy is shaped by external institutional pressures that influence how asset managers respond to sustainability regulations and market expectations. Institutional Theory categorizes these pressures into three forces: coercive, normative, and mimetic (DiMaggio & Powell, 1983; Scott, 1995). These forces explain why real estate firms adopt EU Taxonomy-aligned climate adaptation measures, often beyond direct financial incentives.

Asset managers do not operate in a vacuum; they respond to regulatory shifts, investor demands, and competitive market trends. This subchapter investigates how these institutional pressures influence the decision-making of asset managers.

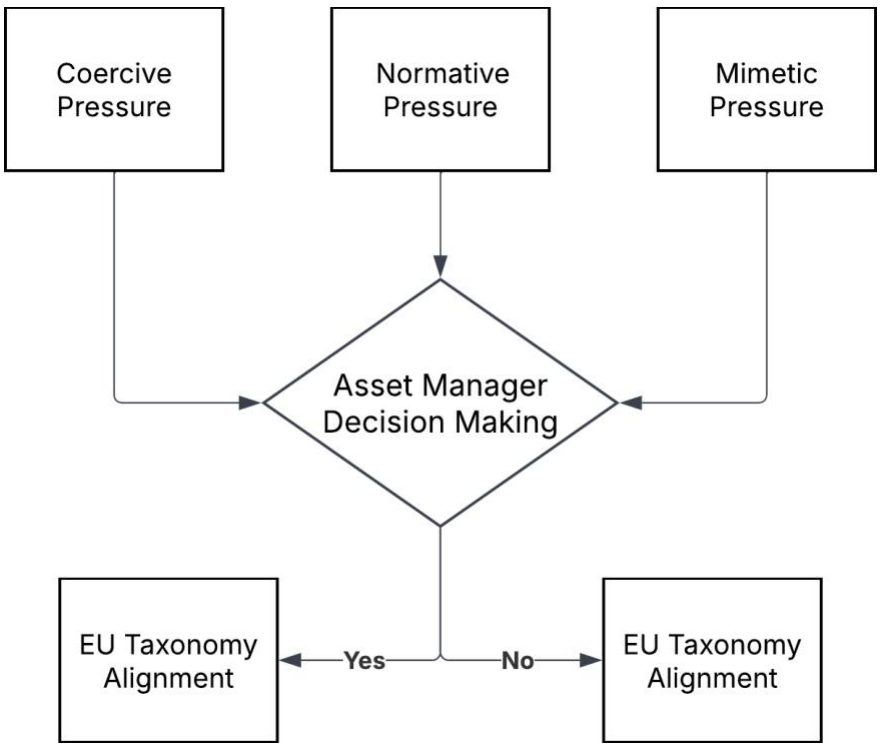


Figure 5: Framework showing the institutional pressures influencing the decision-making (own work)

3.4.3.1 Coercive Pressure

Coercive pressure comes from regulatory mandates that compel asset managers to comply with sustainability requirements, often to secure green financing or mitigate legal risks. Government regulations, financial disclosure obligations, and legal accountability create compliance-driven incentives for firms to integrate sustainability into their portfolios. Non-alignment increases financial and reputational risks, as tightening reporting standards make it harder for non-compliant assets to attract investors or maintain long-term value (Martínez-Ferrero & García-Sánchez, 2017). Properties that do not meet established sustainability criteria risk becoming discounted assets, meaning they may experience devaluation or obsolescence due to changing market preferences and regulatory enforcement.

3.4.3.2 Normative Pressure

Normative pressure comes from market expectations, ESG investment trends, and industry benchmarks Institutional investors, including pension funds and insurance companies, increasingly demand taxonomy-aligned investments, reinforcing sustainability as a competitive necessity. In addition, sustainability benchmarks such as GRESB, BREEAM(-NL), and LEED establish widely accepted performance standards, further pressuring asset managers to align with best practices (Martínez-Ferrero & García-Sánchez, 2017).

In addition to voluntary benchmarks, corporate social responsibility (CSR) commitments made by real estate firms contribute to normative pressure. Many large real estate investors publicly commit to net-zero carbon targets and sustainability disclosures, increasing pressure on smaller asset managers to follow to maintain credibility and avoid negative reputational effects.

3.4.3.3 Mimetic Pressure

Mimetic pressure occurs when firms imitate competitors' sustainability strategies, particularly when market leaders successfully implement sustainable measures (DiMaggio & Powell, 1983). This pressure is increased by uncertainty surrounding the financial benefits of EU Taxonomy compliance. The fear of market exclusion further reinforces imitation, as firms strive to maintain access to capital, tenants, and investment opportunities (Fernández et al., 2015). While mimetic pressure can drive sustainability adoption, asset managers must critically assess whether aligning with industry trends adds long-term portfolio value

4 Case Study

4.1 Introduction

In recent years, the increasing frequency of extreme weather events, such as heavy rainfall, heatwaves, and storms, has underscored the urgency of mitigating and adapting to climate-related risks in the built environment (IPCC, 2021). Existing office buildings, many of which were constructed decades ago, are particularly vulnerable to these changes. Aging infrastructure, outdated insulation, and insufficient stormwater management systems can increase the impacts of climate risks, leading to higher operational costs, reduced occupant comfort, and potentially lower property values (Sayce et al., 2022).

This case study presents an example-based analysis of an office buildings that has undergone climate adaptation measures to enhance sustainability and resilience. Groot Willemsplein in Rotterdam, is an example of an office building integrating green infrastructure in an urban setting. Originally constructed in the late 20th century, this building is situated in the densely built-up Maritime District of Rotterdam, an area that has experienced significant redevelopment in recent years. The building is positioned along the Nieuwe Maas river, making it particularly susceptible to climate-related risks such as flooding and extreme rainfall events. The adaptation measures implemented in this building focus on water retention, green infrastructure, and energy-efficient mobility solutions (top010, 2013).

Figure 6: Picture of Groot Willemsplein with green roof renovation (top010, 2013)

To provide a complementary perspective, this case example with similar characteristics has been selected for further analysis. This example includes the implementation of a green roof, for. While the building itself exists, the green spaces and permeable pavements are hypothetical, designed to illustrate the possible application of climate adaptation strategies. The purpose of this case is to offer a physical representation of how such measures demonstrate in real-life applications, allowing for a better understanding of their spatial impact and integration into the built environment.

4.2 Purpose and Scope of the Case Study

By evaluating the feasibility, expenses, benefits and broader implications of carrying out these climate-adaptive improvements using the framework of the EU Taxonomy, this case study aims to go beyond risk identification and the fitting adaptive measures. Under this framework, real estate activities, especially renovation projects, are subject to certain substantial contribution criteria and requirements relating to biodiversity, water, circular economy, pollution prevention, climate mitigation and adaptation (European Commission, 2024).

By closely examining how each proposed measure aligns with the EU Taxonomy's screening criteria, this case will reveal:

1. **Feasibility**: The case will explore whether alignment with the EU Taxonomy provides opportunities for green financing, tax incentives, or subsidies that could offset initial costs, and how these benefits might compare to a non-aligned approach. For non-aligned projects, the analysis will consider whether the savings from avoiding additional compliance-related costs can make investments more financially attractive, especially for smaller-scale projects or companies prioritizing flexibility.

2. **Strategic Benefits**: In what ways could these measures improve asset value, marketability, and regulatory compliance? Alignment with the EU Taxonomy may enhance a building's ESG (Environmental, Social, and Governance) profile, improving its attractiveness to sustainability-focused investors and tenants. On the other hand, the case will evaluate whether a non-aligned strategy could still achieve strategic goals by focusing on market-specific demands and leveraging other sustainability certifications or frameworks that resonate with tenants or stakeholders.

3. **Operational Challenges**: What administrative steps, documentation, or expert verifications might be required for alignment with EU Taxonomy guidelines? Alignment introduces additional complexities, such as third-party verification, detailed climate risk assessments, and adherence to reporting standards, which may benefit organizations focused on robust sustainability tracking. However, non-alignment may offer streamlined operations, reduced administrative burdens, and faster project implementation, making it an appealing choice for projects or stakeholders prioritizing efficiency and simplicity.

4. **Long-Term Implications**: How will adopting these measures position the building (and the company that owns it) in terms of future climate-related regulations and investor expectations? While proactive alignment may position the building to meet future regulatory requirements and attract ESG-conscious investors, the case will also examine how a non-aligned approach could still achieve resilience and appeal by focusing on practical, cost-effective solutions tailored to specific market or stakeholder needs.

The main objective is to give asset managers, especially those who are unfamiliar with the EU Taxonomy, practical insights. This case study aims to enable decision-makers to make well-informed decisions by showing light on the actual costs and advantages of climate-adaptive renovations as well as the complexities of EU Taxonomy alignment regulations. A clear analysis of the benefits and cons of the policy will help people who are worried about the possible administrative and financial difficulties make a fair judgement.

In conclusion, this Dutch office building's renovation is a representation of the potential and difficulties encountered by real estate stakeholders in a time when climate concerns are increasing.

4.3 Climate Risks Facing the Building

4.3.1 Flooding and Heavy Rainfall

This building's increased risk of flooding during times of intense rainfall is the main cause for concern. Intense rainstorms can overwhelm local drainage systems, resulting in basement seepage and street-level flooding. The issue is made worse by the impermeable surfaces surrounding the office complex, like parking lots and concrete walkways, which stop water from penetrating the earth. According to local climate projections, the frequency of extreme rainfall events in the region could increase by up to 25% by 2050 (KNMI, n.d.). Even without a significant rise in sea levels, these sudden downpours can lead to flash floods if stormwater infrastructure is not upgraded or supplemented with nature-based solutions.

4.3.2 Heatwaves and Urban Heat Island Effect

Summers are becoming increasingly hot, with the number of heatwave days in the Netherlands showing an upward trend over recent decades. This intensifies the urban heat island effect, where cities experience higher temperatures than surrounding rural areas due to concentrated buildings, asphalt, and limited green cover. Projections suggest that heatwave frequency could double or triple if global greenhouse gas emissions continue unchanged (IPCC, 2021). For an older office building lacking modern insulation, these temperature spikes strain cooling systems, raise energy consumption, and affect tenant well-being.

4.4 Proposed Climate-Adaptive Renovations

To address the identified climate risks and improve the building's resilience, the renovation plan incorporates three key measures that target both adaptation objectives. Each measure is designed to address specific vulnerabilities while enhancing the overall sustainability and functionality of the office building. As shown in the table below:

Initiative	Purpose	Method	Expected Outcomes
Green Roof Installation	Reduce stormwater runoff, improve insulation, and moderate indoor temperatures.	A specially designed roof system featuring layers of waterproof membrane, drainage, substrate, and vegetation to absorb rainfall and buffer temperatures.	Enhanced energy efficiency, reduced risk of flooding, and contribution to local biodiversity.
Nature-Based Infiltration Systems	Manage excess rainwater and recharge groundwater.	Incorporation of permeable surfaces, rain gardens, or bio-retention basins around the building's perimeter.	Lower pressure on municipal drainage systems, reduced likelihood of on-site flooding and complements green roof infiltration.
Adding electric vehicle (EV) chargers and improving monitoring equipment	To support sustainable transportation and enhance infrastructure efficiency.	Installing EV chargers while replacing pavement and upgrading monitoring systems for water runoff and energy usage.	Encourages the use of electric vehicles, reduces greenhouse gas emissions, and improves water and energy management for the site.

Table 7: The list of measures combined with the purpose, method and expected outcome (own work).

The requirements for alignment to the EU Taxonomy will be discussed. The technical screening requirements for each measure, the documentation and verification procedures required to guarantee compliance, and the possible benefits of reaching Taxonomy alignment. The analysis will also consider how the absence of alignment impacts the process, potentially simplifying administrative requirements while missing certain benefits.

The financial implications will be evaluated, considering extra costs and costs for administrative tasks to ensure alignment. Broader benefits, such as increased market value, enhanced tenant comfort, reduced climate risk exposure, and improved environmental performance, will also be discussed. By comparing the processes and outcomes of aligning or not aligning with the EU Taxonomy, the case study aims to provide a balanced perspective on the strategic decisions asset managers face in implementing these climate-adaptive measure.

4.5 EU Taxonomy Requirements

4.5.1 Green Roof Installation

Green roofs are recognized under the EU Taxonomy as contributing to both the renovation of existing buildings and sustainable urban drainage systems (SUDS). This classification is supported by specific regulations and directives that outline technical screening (European Commission, 2024).

Measure	Categories	Activities
Install green roof to reduce runoff and improve insulation	Construction and Real Estate Activities	Renovation of existing buildings
	Water supply, sewerage, waste management and remediation	Sustainable urban drainage systems (SUDS)

Table 8: Categories and activities related to the installation of a green roof (derived from EU Taxonomy Compass, 2024).

Green roofs, as part of renovation activities, are aligned with the EU Taxonomy by meeting the substantial contribution criteria. The following detailed requirements, derived from *Regulation (EU) 2020/852* and its delegated acts, specify how these criteria must be fulfilled:

Substantial Contribution Criteria – Climate Adaptation – Renovation of Existing Buildings
Implementation of Adaptation Solutions:
"The economic activity must implement physical and non-physical solutions ('adaptation solutions') that substantially reduce the most important physical climate risks material to the activity (EU Taxonomy Compass, 2024)."
Climate Risk and Vulnerability Assessment:
A robust climate risk and vulnerability assessment must be conducted to identify and address physical climate risks. This includes: - Screening the activity to identify which physical climate risks, listed in Appendix A (appendix 2), may affect its performance during its expected lifetime. - Conducting a detailed climate risk and vulnerability assessment if the activity is found to be at risk, to determine the materiality of these risks. Assessing and implementing adaptation solutions that effectively reduce the identified risks. The assessment must be proportionate to the scale of the activity and its expected lifespan: - For activities with a lifespan of less than 10 years, climate projections at the smallest appropriate scale are used. - For activities with longer lifespans, the assessment uses high-resolution, state-of-the-art climate projections, including 10 to 30-year scenarios for major investments, consistent with the expected lifetime of the activity.
Use of State-of-the-Art Science and Best Practices:
Climate projections and impact assessments must align with best practices and state-of-the-art science, based on: - The latest Intergovernmental Panel on Climate Change (IPCC) reports. - Scientific peer-reviewed publications and open-source or proprietary models where applicable.
Criteria for Adaptation Solutions:
Adaptation solutions implemented as part of the renovation must: - Avoid adversely affecting the adaptation efforts or resilience of other people, nature, cultural heritage, assets, or other economic activities. - Prefer nature-based solutions or rely on blue or green infrastructure to the greatest extent possible. - Align with local, sectoral, regional, or national adaptation plans and strategies. - Be monitored and measured against pre-defined indicators, with remedial action taken if indicators are not met.

Table 9: Substantial contribution criteria for the renovation of existing buildings (derived from EU Taxonomy Compass, 2024).

In the context of sustainable urban drainage systems (SUDS), *Regulation (EU) 2020/852* and its Delegated Acts, alignment is only possible by contributing to the objective of sustainable use and protection of water and marine resources. These requirements are:

Substantial Contribution Criteria – Water – Sustainable Urban Drainage Systems (SUDS),
Integration in Urban Systems
The construction and operation of the sustainable urban drainage system (SUDS) must be integrated into the urban drainage and wastewater treatment system. This must be demonstrated via a flood risk management plan or other relevant urban planning tools.
Contribution to Water Quality and Status
The activity must contribute substantially to achieving or maintaining the good status and ecological potential of surface water and groundwater bodies or prevent deterioration of those already in good status. Compliance with *Directive 2000/60/EC* and *Directive 2008/56/EC* is required.
Retention Percentage Reporting
Information must be provided on the percentage of a specific area (e.g., residential or commercial) where rainwater is retained within the area instead of being directly drained.
Design Effects
The design of the sustainable urban drainage system must achieve at least one of the following: - A quantified percentage of rainwater in the catchment area is retained and discharged with a staggered delay to receiving water bodies. - A quantified percentage of pollutants, including oil, heavy metals, hazardous chemicals, and microplastics, is removed from urban runoff before discharge into receiving water bodies. - The runoff peak flow, with a return period in line with flood risk management plans or local provisions, is reduced by a quantified percentage.

Table 10: Substantial contribution criteria for sustainable urban drainage systems (SUDS) (derived from EU Taxonomy Compass, 2024).

An activity must also "do no significant harm" (DNSH) to any of the other five environmental objectives and meet minimum safeguards. The DNSH criteria related to the installation of the green roof are specified in the *Commission Delegated Regulation (EU) 2021/2139*, which supplements *Regulation (EU) 2020/852* (the EU Taxonomy Regulation).

DNSH Criteria	
DNSH: Climate adaptation	- The activity complies with the criteria set out in Appendix A (appendix 2) (robust climate risk and vulnerability assessment; adaptation solutions that do not adversely affect others and are consistent with adaptation plans).
DNSH: Circular economy	- At least 70% (by weight) of non-hazardous construction and demolition waste is prepared for reuse, recycling, or other material recovery. - Limit waste generation, use selective demolition to enable high-quality recycling. - Building design and techniques support circularity, referencing ISO 20887 or similar standards to ensure adaptability and dismantlability.
DNSH: Pollution prevention	- Building components and materials comply with criteria in Appendix C (appendix 3) (low emissions of formaldehyde and carcinogenic VOCs). - Measures taken to reduce noise, dust, and pollutant emissions during works. - Treatment of water occurs before discharge or infiltration into the environment
DNSH: Water	- N/A
DNSH: Biodiversity	- Environmental Impact Assessment (EIA) or screening has been completed in accordance with Directive 2011/92/EU. - Invasive species of fauna are managed in accordance with Regulation (EU) No 1143/2014.

Table 11: Do No Significant Harm (DNSH) criteria for the implementation of the green roof (derived from the EU Taxonomy Compass, 2024).

4.5.2 Nature-Based Infiltration Systems

Permeable pavements are recognized under the EU Taxonomy as contributing to both the renovation of existing buildings and sustainable urban drainage systems (SUDS).

Measure	Categories	Activities
Incorporation of permeable surfaces, rain gardens, or bio-retention basins around the building's perimeter.	Construction and Real Estate Activities	Renovation of existing buildings
	Water supply, sewerage, waste management and remediation	Sustainable urban drainage systems (SUDS)

Table 12: Categories and activities related to the installation of permeable pavements (derived from EU Taxonomy Compass, 2024).

Permeable pavements, rain gardens or bio-retention basis, as part of renovation activities, are aligned with the EU Taxonomy by meeting the substantial contribution criteria. These criteria are mentioned in table 8. The measures are also classified under the Sustainable Urban Drainage Systems, these criteria are mentioned in table 9. The DNSH criteria are the same as in the previous subchapter since the alignment requirements for the activities are the same, they can be seen in Table 10.

4.5.3 Adding electric vehicle (EV) chargers and improving monitoring equipment

The installation of electric vehicle (EV) chargers and the improvement of monitoring equipment are recognized under the EU Taxonomy. These activities align with the criteria specified in the regulation and are detailed in the tables referenced below.

Measure	Categories	Activities
Adding electric vehicle (EV) chargers and improving monitoring equipment	Construction and Real Estate Activities	Renovation of existing buildings
	Construction and Real Estate Activities	Installation, maintenance and repair of charging stations for electric vehicles in buildings (and parking spaces attached to buildings)
	Construction and Real Estate Activities	Installation, maintenance and repair of instruments and devices for measuring, regulation and controlling energy performance of buildings
	Transport	Infrastructure enabling low-carbon road transport and public transport

Table 13: Categories and activities related to the installation EV Chargers and improving monitoring equipment (derived from EU Taxonomy Compass, 2024).

The required substantial contribution criteria for the renovation of existing buildings are outlined in Table 8.

The activity “Installation, maintenance, and repair of charging stations for electric vehicles in buildings (and parking spaces attached to buildings)” aligns with the EU Taxonomy by meeting the requirements derived from *Regulation (EU) 2020/852* and its delegated acts. These requirements ensure that the installation of EV chargers supports the transition to low-carbon transport while adhering to the regulation's technical screening criteria.

Substantial Contribution Criteria – Climate Adaptation – Installation, maintenance and repair of charging stations for electric vehicles in buildings (and parking spaces attached to buildings)
Implementation of Adaptation Solutions
“The activity has implemented physical and non-physical solutions (‘adaptation solutions’) that substantially reduce the most important physical climate risks that are material to the activity.”
Identification of Material Physical Climate Risks
A robust climate risk and vulnerability assessment must be conducted, following these steps: - Identify physical climate risks from Appendix A (appendix 2) that may affect the activity's performance during its expected lifetime. - If at risk, assess the materiality of physical climate risks on the activity. - Assess and implement adaptation solutions that can reduce identified physical climate risks.
Proportionality of Climate Risk and Vulnerability Assessment
The assessment must match the activity’s scale and expected lifespan: - Use climate projections at the smallest appropriate scale (for activities under 10 years). - Use high-resolution, state-of-the-art climate projections, including 10 to 30-year scenarios for major investments (for longer term).
Climate Projections and Impact Assessments
Based on best practices and guidance, the assessments must incorporate: - Follow methodologies in the latest IPCC reports, scientific peer-reviewed publications, and open-source or paid models.

Requirements for Implemented Adaptation Solutions
Adaptation solutions must: - Not harm the adaptation efforts, resilience of other people, nature, cultural heritage, assets, or other economic activities. - Rely on blue or green infrastructure whenever possible. - Align with local, sectoral, regional, or national adaptation plans and strategies. - Be monitored against pre-defined indicators, with remedial actions taken if indicators are not met.

Table 14: Substantial contribution criteria for Installation, maintenance and repair of charging stations for electric vehicles in buildings (and parking spaces attached to buildings (derived from EU Taxonomy Compass, 2024).

The activity “Installation, maintenance, and repair of instruments and devices for measuring, regulation, and controlling energy performance of buildings” is similarly aligned with the EU Taxonomy. The detailed requirements for this activity correspond to those specified in table 13.

The activity “Infrastructure enabling low-carbon road transport and public transport” is also aligned with the EU Taxonomy. For alignment only mitigation criteria are mentioned in the EU Taxonomy.

Substantial Contribution Criteria – Climate Mitigation – Infrastructure enabling low-carbon road transport and public transport
Activity Criteria
The activity must comply with one or more of the following criteria: - The infrastructure is meant for electric vehicles, charging ports, grid upgrades, hydrogen fuelling stations or electrical road systems (ERS). - The infrastructure is meant for freight transport. - The infrastructure is meant for urban or suburban public transport.
Fossil fuels
The infrastructure cannot be dedicated for the transport of fossil fuels.

Table 15: Substantial contribution criteria for Infrastructure enabling low-carbon road transport and public transport. (derived from EU Taxonomy Compass, 2024).

4.6 EU Taxonomy Alignment Implications

Aligning climate-adaptive measures with the EU Taxonomy significantly impacts the feasibility of renovation projects, influencing costs, timelines, and project management processes. This section explores the implications for green roof installation, nature-based infiltration systems, and the addition of electric vehicle (EV) chargers with monitoring equipment, focusing on technical, financial, and administrative challenges associated with compliance.

4.6.1 Green Roof Installation

The first step in aligning green roof installations with the EU Taxonomy is conducting a comprehensive Climate Risk and Vulnerability Assessment (CRVA). This process identifies climate-related risks, such as extreme heat, flooding, and storms, which could affect the performance of the green roof. The CRVA involves three key phases (European Commission, 2024):

1. **Screening of the Activity**: The project must identify which physical climate risks, such as extreme heat, flooding, or storms, may affect the performance of the installation during their expected operational lifespan.

2. **Assessment of Materiality**: If the activity is found to be at risk from one or more physical climate hazards, a detailed assessment is required to determine the materiality of these risks on the infrastructure’s performance. This assessment evaluates the likelihood and potential impact of identified risks on the resilience and longevity of the installation.

3. **Adaptation Solutions:** Based on the identified risks, appropriate adaptation solutions must be implemented.

The climate projections and risk assessments must align with best practices, relying on methodologies as recommended in the latest Intergovernmental Panel on Climate Change (IPCC) reports. The adaptation solutions implemented should:

- **Avoid Adverse Effects:** They must not negatively impact the adaptation efforts or resilience of other communities, ecosystems, cultural heritage, assets, or economic activities.

- **Favour Nature-Based Solutions**: Where feasible, adaptation measures should incorporate blue or green infrastructure, such as natural shading, vegetated barriers, or permeable surfaces around EV installations to manage stormwater runoff

- **Align with Adaptation Plans:** Solutions should be consistent with local, regional, or national climate adaptation strategies, ensuring coherent and integrated risk management.

- **Monitoring and Evaluation:** The effectiveness of adaptation measures must be monitored using predefined indicators. If performance targets are not met, counteractive actions must be considered to address any flaws.

Specialized expertise is required to perform the CRVA, including climate data analysis and scenario modelling. This leads to increased costs and resource demands. After the CRVA, the design phase must incorporate sustainable materials, such as high-recyclability membranes and low-VOC (volatile organic compound) materials, to reduce environmental impact. Furthermore, at least 70% of construction waste must be recycled or reused, necessitating selective demolition and waste management practices, which increase both labour costs and project duration. The construction process itself must comply with ISO 20887 standards, which emphasize building circularity and efficiency.

Moreover, for the project to align with the EU Taxonomy, it must meet specific requirements related to sustainable urban drainage systems (SUDS). The green roof installation must contribute to rainwater retention and water quality improvement. This involves integrating the construction and operation of the drainage system within the existing urban drainage and wastewater treatment infrastructure, as demonstrated through a flood risk management plan or other relevant urban planning tools. Compliance with Directive 2000/60/EC (the Water Framework Directive) and Directive 2008/56/EC (the Marine Strategy Framework Directive) is mandatory, necessitating thorough documentation and potentially additional environmental impact assessments.

The project must also provide detailed information on the percentage of the site area where rainwater is retained instead of being directly drained. The sustainable drainage system must achieve at least one of the following effects: (1) retain and discharge a quantified percentage of rainwater with a staggered delay to receiving water bodies, (2) remove a quantified percentage of pollutants such as oil, heavy metals, hazardous chemicals, and microplastics from urban runoff, or (3) reduce runoff peak flow in accordance with local flood risk management plans.

Operationally, the project may experience extended timelines due to the comprehensive nature of the CRVA and the additional requirements for water management integration. The time required to complete these assessments and obtain the necessary approvals can vary significantly depending on the project's scale, site conditions, and the availability of relevant environmental data. These potential delays, combined with the strict material and waste management requirements, as well as the technical complexities of integrating sustainable drainage systems, can impact both the feasibility and scheduling of the project.

4.6.2 Nature Based Infiltration Systems

The alignment process for nature-based infiltration systems closely parallels that of green roofs. Both require a Climate Risk and Vulnerability Assessment (CRVA) to identify and address climate-related risks, applying similar adaptation strategies, waste management practices, and sustainability principles. Additionally, these systems must be integrated with existing urban drainage and water treatment infrastructure, while accounting for the percentage of rainwater retained. As a result, the technical, financial, and administrative implications associated with green roofs are equally applicable to nature-based infiltration systems.

4.6.3 Adding electric vehicle (EV) chargers and improving monitoring equipment

The alignment criteria for installing EV chargers and enhancing monitoring equipment are comparable to those for green roofs, particularly concerning climate adaptation. Both activities require a CRVA to identify potential climate-related risks, evaluate their material impact, and develop adaptation measures to ensure infrastructure resilience. For EV infrastructure, the CRVA focuses on risks such as extreme heat, flooding, and severe storms, which may affect equipment performance and safety. Sustainability requirements also apply, including the use of eco-friendly materials, adherence to circular economy principles, and the preparation of at least 70% of construction waste for reuse or recycling.

Although the specific technical requirements vary, the overarching alignment process with the EU Taxonomy is consistent across all three measures. The framework introduces additional costs, extended timelines, and regulatory complexities but enhances project resilience and sustainability in the long term.

4.7 Cost Benefit Analysis (CBA)

This chapter presents a cost-benefit analysis of the proposed climate-adaptive improvements for the chosen office building. Cost estimates for building and circularity improvements are based on scientific research. The building's hypothetical size and extent of renovation are approximated using reasonable assumptions consistent with previous projects. The benefits of these initiatives are based on current literature, which details their financial, environmental, and strategic benefits.

4.7.1 Overview of Building and Scope of Renovation

The estimated square meter allocations of the adaptation interventions are estimations of surface areas made using Google Maps and an analysis of the building’s footprint. The renovation of the Groot Willemsplein office building incorporates several adaptation strategies aimed at improving climate resilience. The estimated allocations for these measures are as follows:

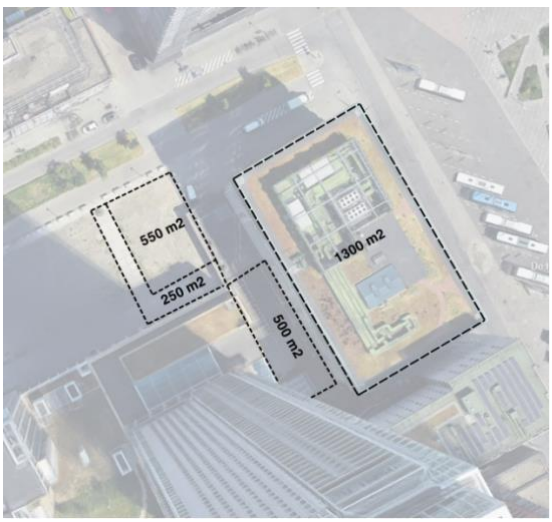


Figure 7: Estimated square footage of each measure (own work, derived from Google Maps).

Green Roof:
1,300 m²

Rain Gardens and Water Retention Basins:
550 m²

Permeable pavement in EV parking areas:
500 m²

Additional permeable pavement next to green areas:
250 m²

Electric Vehicle Infrastructure:
15 EV chargers

4.7.2 Costs

The implementation of sustainability measures in office buildings results in additional costs, which can be categorized into three main aspects: the green roof, permeable pavements and rain gardens/bio-retention areas.

The cost of installing a green roof varies depending on its structure and the type of vegetation used. Based on pricing data obtained from Solar Sedum (2024), the cost per square meter for a sedum green roof is estimated at €120/m². These costs typically include substrate layers, drainage systems, and installation fees. The costs of implementing permeable pavement systems vary depending on the materials used, such as permeable concrete, porous asphalt, or interlocking pavers. For this analysis, the cost per square meter is estimated at €75/m², based on data gathered from similar projects and industry reports. The cost of implementing these systems depends on factors such as excavation, soil amendment, and plant selection. According to Gids Duurzame Gebouwen (2024), the estimated cost per square meter is €70/m², which includes the necessary landscaping and infrastructure adjustments.

The cost of installing EV chargers depends on factors such as charging capacity, installation complexity, and grid connection requirements. According to pricing information from Bobex (2024), the cost per unit for an EV charger is approximately €1,750. These chargers include smart charging and monitoring.

Groot Willemsplein			
Renovation Costs	**Cost per m2**	**Price per unit**	**Costs**
Green Roof Installation	€ 120		€ 156.000
Permeable Pavements	€ 75		€ 56.250
Rain Gardens/Bio-Retention	€ 7		€ 38.500
EV Chargers		€ 1.750	€ 26.250
			€ 277.000

Table 16: Total cost of the renovation for Groot Willemsplein (own work).

When combining these renovation measures, the total estimated cost amounts to €277,000. This sum reflects the expenses associated with green roof installations, permeable pavements, rain gardens, and EV chargers, but does not include any additional alignment costs or potential financial incentives that might reduce the overall expenditure.

4.7.3 Additional Costs for EU Taxonomy Alignment

Ensuring compliance with the EU Taxonomy for sustainable construction requires additional financial considerations. A key component of this alignment is the cost associated with waste management, particularly for materials that must adhere to stricter environmental standards. The waste management costs were assessed based on the specific materials applicable to the implemented sustainability measures. According to the study by Illankoon & Lu (2020), obtaining construction waste management credits incurs an additional cost ranging from 0.4% to 6% of total construction costs. The types of materials related to the measures were analysed and based on that the estimated low and high premium is calculated.

For the green roof, the premium cost ranges from 1.4% to 4.1%, leading to added costs between € 2,184 and € 6,396. Permeable pavements also have an extra waste management premium, estimated between 1% and 4.1%, translating to additional costs of € 562,50 to € 2.306,25. For Rain Gardens/Bio-Retention, the waste management cost premium similarly falls between 1% and 4.1%, resulting in extra costs ranging from € 385 to € 1.578,50 (Illankoon & Lu, 2020).

EV chargers do not contribute to additional waste management costs in this calculation, as their installation does not involve significant material disposal or processing.

Waste Management	Premium Low	High	Added Costs Low	High
Green Roof Installation	1,4%	4,1%	€ 2.184	€ 6.396
Permeable Pavements	1%	4,1%	€ 562	€ 2.306
Rain Gardens/Bio-Retention	1%	4,1%	€ 385	€ 1.578
EV Chargers	-	-	-	-
			€ 3.131,50	**€ 10.280,75**

Table 17: Total cost of extra waste management (own work).

Summing up these figures, the total additional cost for waste management under the EU Taxonomy compliance framework falls within a range of € 3.131,50 to € 10.280,75, depending on the extent of material use and the waste segregation methods applied.

Aligning renovation projects with circular material practices aligned with the ISO 20887 introduces additional costs, primarily due to the selection and integration of sustainable and recyclable materials. Based on literature estimates (Miraj et al., 2021; Gabay et al., 2014; Russ et al., 2018) the additional cost for green construction practices in office buildings ranges between 5% and 9% of the total material costs.

For Green Roof Installation, the circular material uses premium results in additional costs between € 7.800 and € 14.040. These costs stem from using recycled and sustainably sourced materials in the roofing system. Permeable pavements also incur a similar premium, with added costs ranging from € 2.812,50 to € 5.062,50. This increase is associated with using alternative materials such as recycled concrete or permeable aggregates. For Rain Gardens/Bio-Retention, the additional costs due to circular material use range from € 1.925 to € 3.465. These costs primarily reflect the procurement of sustainable soil amendments, eco-friendly geotextiles, and regionally sourced plant materials that align with circular construction guidelines.

EV chargers do not contribute to additional circular material use costs in this assessment, as their installation does not significantly involve material selection aligned with circularity principles The EV chargers themselves are already in similar accordance with the ISO 20887, as stated by the manufacturer.

Circular Material Use (ISO 20887)	Premium Low	High	Added Costs Low	High
Green Roof Installation	5%	9%	€7.800	€ 14.040
Permeable Pavements	5%	9%	€ 2.812,50	€ 5.062,50
Rain Gardens/Bio-Retention	5%	9%	€ 1.925	€ 3.465
EV Chargers	-	-	-	-
			€ 12.537,50	**€ 22.567,50**

Table 18: Total cost of extra green certification for circular material use (own work).

Summing these figures, the total additional cost for implementing circular material use in line with ISO 20887 is estimated to be between € 12.537,50 and € 22.567,50, depending on the level of material sustainability and circularity adopted in the renovation process. This accounts for design strategies promoting adaptability, reuse, and sustainability of materials.

The cost analysis of aligning a renovation project with the EU Taxonomy criteria highlights the financial implications of integrating sustainability measures. The total renovation cost without

EU Taxonomy alignment stands at € 277.000, whereas incorporating the required waste management and circular material use measures raises the cost to a range between € 292.669 and € 309.848,25. This results in an added cost for alignment of approximately € 15.669 to € 32.848,25, depending on the level of compliance and materials used. A total increase between 5,35% and 10,6%.

Renovation Type	Total Cost (Low)	Total Cost (High)
Without EU Taxonomy Alignment	€ 277.000	€ 277.000
With EU Taxonomy Alignment	€ 292.669	€ 309.848,25
Added Cost for Alignment	**€ 15.669**	**€ 32.848,25**
Premium	**+ 5,35%**	**+ 10,6%**

Table 19: Overview of all the total costs for alignment (own work).

While these additional costs represent a significant investment, they are essential to meeting sustainability requirements and ensuring long-term environmental benefits. It is important to note that the Climate Risk and Vulnerability Assessment (CRVA) is not included in this cost calculation. Since CRVA is conducted at a portfolio level rather than for individual buildings, its specific cost allocation per building remains complex. However, this assessment is mandatory for compliance with the EU Taxonomy alignment criteria.

4.8 Benefits

Although the financial premium directly associated with EU Taxonomy alignment remains under-researched, multiple indirect benefits are well-documented across various strands of academic and industry literature. These benefits can enhance a renovation project's long-term performance, market competitiveness, and overall resilience. The following sections summarize some of the primary advantages.

4.8.1 Enhanced Market Attractiveness and Asset Value

Renovations aligned with the EU Taxonomy can improve the attractiveness of real estate assets to investors and tenants. Studies on certified green buildings have consistently noted higher transaction prices and rental premiums compared to non-certified counterparts (Van Overbeek et al., 2024; Kok & Jennen, 2012). Although the EU Taxonomy itself is relatively new, the underlying principles, such as energy efficiency, resource conservation, and climate resilience, mirror many established green building criteria.

By demonstrating compliance with EU Taxonomy standards, building owners signal that their assets meet strict sustainability benchmarks, potentially imposing a "green premium". These price and rent differences come from:

1. **Reduced long-term operational costs**: Energy and water efficiency measures can lower utility expenses and maintenance outlays over the building's lifecycle (Robinson et al., 2018).

2. **Risk adaptation:** Properties designed or renovated to manage climate-related risks are perceived as less vulnerable to future disruptions, such as extreme weather (Clayton et al., 2021).

3. **Investor interest:** An increasing number of institutional investors incorporate environmental, social, and governance (ESG) metrics into their portfolios (Brounen et al., 2021). EU Taxonomy alignment helps meet these evolving investment criteria.

4.8.2 Preferential Access to Financing and Lower Cost of Capital

Financial institutions increasingly offer favourable terms for sustainable projects, including green bonds and sustainability-linked loans (European Commission, 2018). Projects meeting EU Taxonomy thresholds may benefit from:

1. **Better financing conditions:** Lenders and investors may view these projects as lower risk due to their alignment with emerging regulatory standards and the anticipated long-term resilience of the asset.

2. **Inclusion in green finance portfolios**: Sustainability-focused funds and banks specifically target projects that meet recognized environmental criteria, such as those in the EU Taxonomy.

While quantifying the exact interest rate reductions or capital cost savings remains challenging, evidence suggests that sustainable construction projects experience better financing conditions than conventional developments (Leutner et al., 2024).

4.8.3 Regulatory Preparedness and Futureproofing

Adhering to the EU Taxonomy positions building owners and developers to better anticipate and comply with future environmental regulations. Regulatory frameworks across Europe increasingly emphasize decarbonization, resource efficiency, and resilience to climate change. By adopting the Taxonomy's principles early, stakeholders can:

1. **Avoid compliance gaps**: Future regulations, such as higher energy performance standards, are more likely to require renovations that meet or exceed Taxonomy thresholds.

2. **Maintain asset liquidity**: Buildings that fall behind evolving regulations risk "brown discounting," where the property's value decreases due to outdated technical or environmental performance (Hoss & Luppi, 2023)

4.8.4 Strengthened Reputation and Stakeholder Confidence

Aligning renovation projects with the EU Taxonomy can be positively viewed by stakeholders such as tenants, employees, investors, and local communities. Demonstrated corporate social responsibility (CSR) can:

1. **Improve brand image:** Companies showcasing a commitment to sustainable practices may gain reputational advantages, potentially leading to higher tenant satisfaction and loyalty.

2. **Enhance community relations:** Sustainable urban drainage systems (SUDS), green roofs, and nature-based infiltration measures can improve local environmental quality, contributing to positive relationships with municipal authorities and residents.

4.8.5 Long-Term Resilience and Risk Management

Finally, one of the central goals of the EU Taxonomy is to accelerate climate adaptation and mitigation. By incorporating elements such as green roofs, permeable pavements, and robust drainage systems, property owners:

1. **Reduce vulnerability to climate risks:** Buildings with integrated resilience measures are better equipped to handle flooding, heatwaves, and severe storms.

2. **Avoid stranded assets**: As climate-related physical and transitional risks grow, buildings lacking adaptation measures may become uninsurable or otherwise unprofitable.

3. **Safeguard rental income**: Disruptions from extreme weather events can lead to property downtime. Resilient designs mitigate damage, reducing potential losses.

4. **Lower operating costs:** The installation of the green roof decreases the amount of cooling needed to create a comfortable climate inside the building. In turn decreasing the total operating costs of the building (Wong et al., 2021).

Although empirical studies quantifying the direct premium for EU Taxonomy-aligned renovations are still very limited, the indirect benefits are increasingly evident. EU Taxonomy compliance can confer advantages such as enhanced property valuations, access to favourable financing, regulatory preparedness, improved stakeholder perception, and heightened resilience. Over time, these factors can offset or even surpass the initial cost premiums associated with sustainable renovation measures, thereby delivering both financial and societal value.

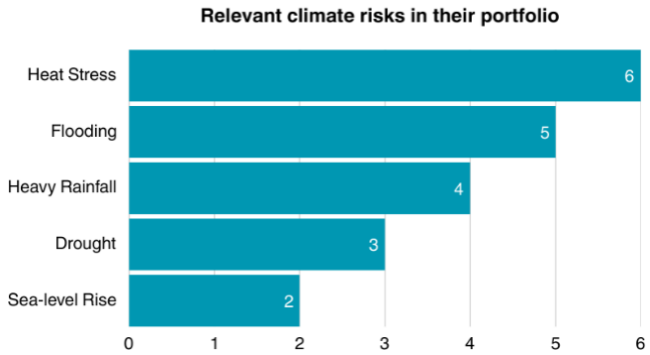
5 Results

This chapter presents the key findings of the research, structured around the main themes derived from the data analysis: Awareness & Familiarity, Impact, Barriers, Climate Risk Considerations, Climate Risk Alignment, Motivation, and Case Study. The results are based on both qualitative and quantitative data obtained through interviews and graphical representations. This section provides an objective summary of the data, focusing on how asset managers interact with the EU Taxonomy in terms of knowledge, implementation, and challenges. Each subsection corresponds to a thematic area.

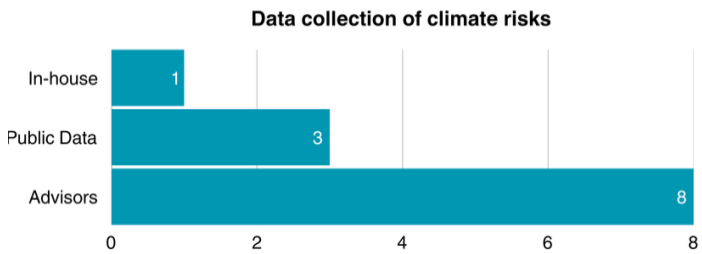
While the results highlight clear trends, they also reveal areas of uncertainty and inconsistency in implementation. These findings will be further explored in the Discussion chapter.

5.1 Climate Risks

The findings indicate that asset managers identify several climate risks as relevant to their portfolios. The most commonly cited risk is heat stress, which was recognized by six out of eight respondents as a significant threat to their assets. This is followed by flooding, which five respondents identified as a relevant risk factor. Heavy rainfall was considered a relevant risk by four respondents, while drought was acknowledged by three. The least frequently cited risk was sea-level rise, with only two respondents indicating that it posed a concern for their portfolios. These results suggest that asset managers are primarily focused on acute weather-related risks that could impact building performance and operational resilience, while longer-term risks, such as rising sea levels, are less frequently highlighted.

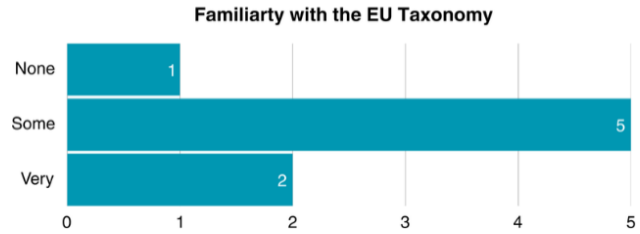


In terms of how climate risk data is collected, the findings show a clear preference for external expertise over internal assessments. All eight respondents reported relying on advisors to collect and analyse climate risk data, indicating a strong dependence on third-party expertise for risk evaluation. Three respondents stated that they use publicly available data as part of their assessment process, while only one asset manager reported conducting in-house climate risk evaluations. These results suggest that while climate risks are widely acknowledged, asset managers largely depend on external sources for data collection and analysis, rather than developing internal capabilities for climate risk assessment.

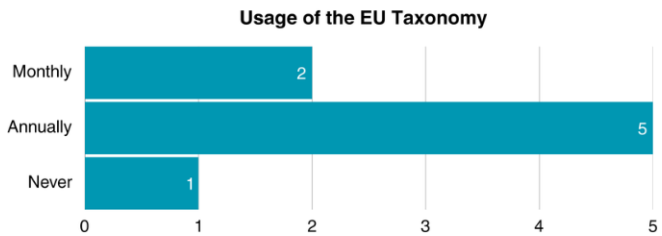


5.2 Awareness and Familiarity with the EU Taxonomy

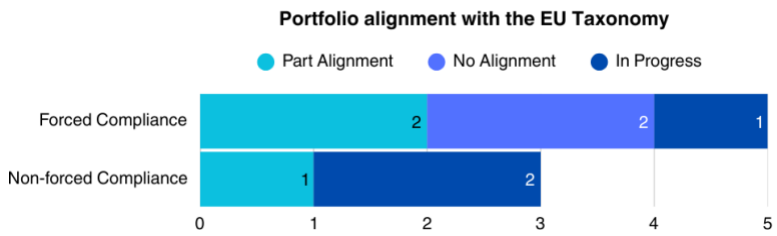
The findings reveal that asset managers have varying levels of familiarity with the EU Taxonomy. While all respondents are at least aware of its existence, their depth of understanding differs. One respondent indicated having no familiarity with the framework, while the majority, five out of eight, reported having some familiarity. This suggests a general awareness of the Taxonomy, although it does not necessarily indicate a strong engagement with its application. Only two respondents described themselves as very familiar, implying a deeper understanding of the framework's technical screening criteria and its impact on investment decision-making. These results highlight that while the EU Taxonomy is widely recognized among asset managers, a comprehensive understanding remains limited to a smaller portion of respondents.



When asked about the frequency of their EU Taxonomy usage, asset managers demonstrated a range of engagement levels. Two respondents indicated that they use it monthly, suggesting an active role in investment strategy, compliance, or reporting processes. The majority, five out of eight, reported using it annually, which likely aligns with periodic regulatory reporting requirements rather than continuous application. One respondent stated that they never use the EU Taxonomy, which may indicate that it is not relevant to their current investment activities or that they rely on alternative sustainability frameworks. These findings suggest that while the EU Taxonomy is being used in asset management, its role is primarily compliance-driven rather than fully integrated into daily investment decision-making.



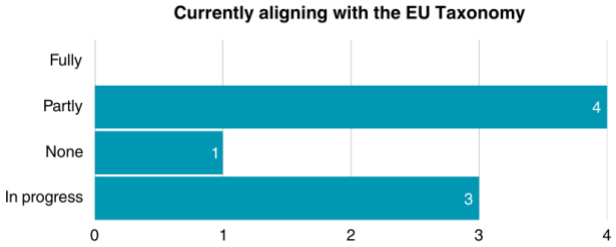
In terms of portfolio alignment, the extent to which asset managers have aligned their portfolios with the EU Taxonomy varies depending on whether compliance is mandated. Among those subject to forced compliance, two respondents reported partial alignment, indicating that certain assets within their portfolios meet the criteria. Two others stated that their portfolios are not aligned at all, and one respondent noted that alignment is currently in progress. In contrast, among asset managers with non-forced compliance, one respondent reported partial alignment, two indicated that alignment is in progress, and none reported full or no alignment.



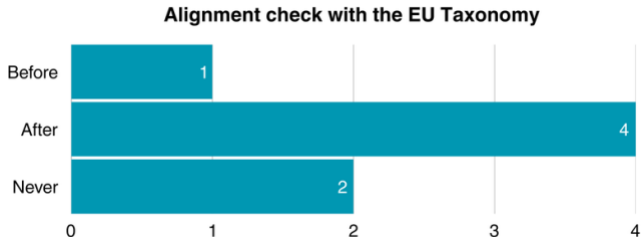
These results suggest that while several asset managers are actively progressing toward compliance, particularly those not yet mandated, full alignment remains limited and uneven across the sector.

5.3 EU Taxonomy Alignment of Climate Risks

The findings indicate that asset managers are at different stages of aligning their portfolios with the EU Taxonomy's climate risk criteria. Four out of eight respondents reported that they are currently partly aligning with the EU Taxonomy, indicating that compliance with the framework is actively being incorporated into their investment strategies. Three respondents stated that they are in progress of aligning, suggesting an interest in future alignment but without full implementation at this stage. Only one respondent indicated that they are not aligning with the EU Taxonomy at all, demonstrating that full non-compliance is relatively uncommon among the interviewed asset managers. None of the asset managers had a fully aligned portfolio.



When examining when asset managers conduct alignment checks with the EU Taxonomy, the responses indicate that most assessments are performed after investment decisions are made. Four respondents stated that they conduct alignment checks after investment decisions, meaning that Taxonomy compliance is evaluated retrospectively rather than as a determining factor in the initial investment process. One respondent indicated that they check for alignment before investment decisions, suggesting a more proactive integration. Two respondents stated that they never check for alignment, indicating that for some asset managers, the EU Taxonomy does not play a role in their investment assessment process.



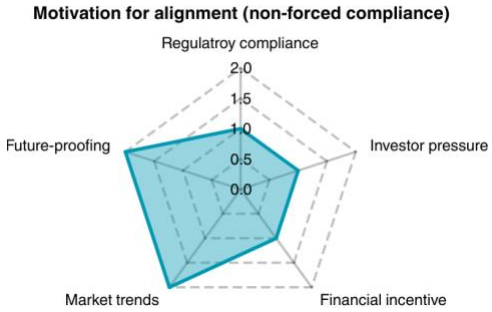
These findings highlight that while a significant portion of asset managers are working towards EU Taxonomy alignment, the extent and timing of integration vary. The results suggest that for many, compliance is considered after investment decisions rather than serving as a primary driver of asset selection.

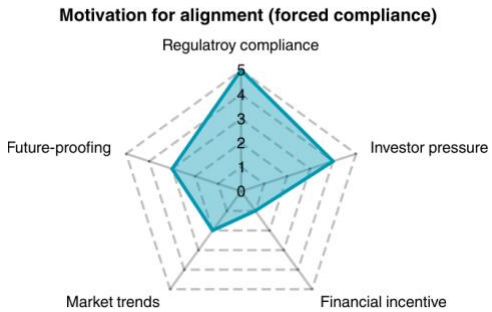
5.4 Motivation to Compliance

The findings indicate that asset managers' motivations for aligning with the EU Taxonomy vary based on whether compliance is forced (5 respondents) non-forced (3 respondents).

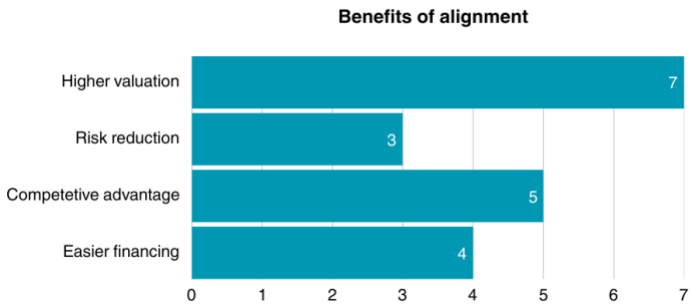
For forced compliance, the strongest motivation is regulatory compliance, with five respondents identifying it as a key driver. Future-proofing is another significant factor, though to a lesser extent. Investor pressure, financial incentives, and market trends appear to have little to no influence when alignment is required by regulations. These results suggest that when asset managers align their portfolios due to regulatory requirements, their primary concern is ensuring compliance rather than responding to external market forces.

For non-forced compliance, where asset managers voluntarily align with the EU Taxonomy, the motivations shift. Future-proofing emerges as the most significant driver, followed by market trends, although both factors remain relatively low compared to forced compliance. Regulatory compliance plays only a minor role in voluntary alignment, indicating that when asset managers choose to comply outside of regulatory mandates, they are more focused on long-term investment resilience and market positioning rather than strict adherence to legal requirements.





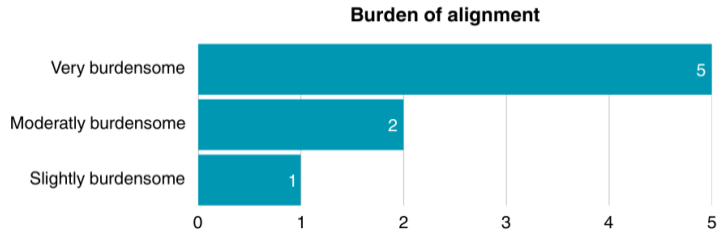
The perceived benefits of alignment with the EU Taxonomy also vary among respondents. The most widely recognized benefit is higher valuation, which was identified by seven asset managers, suggesting that alignment is seen as a factor that enhances asset value in the market. Competitive advantage was the second most cited benefit, with five respondents acknowledging its role in differentiating their portfolios from non-compliant competitors. Easier financing was recognized by four respondents, reflecting the increasing importance of sustainability criteria in securing investment funding. Risk reduction, while still relevant, was mentioned by only three respondents, indicating that while some asset managers view alignment to mitigate financial and environmental risks, others may prioritize different strategic considerations.



These findings provide insight into the key drivers behind EU Taxonomy alignment and the perceived benefits that asset managers associate with compliance.

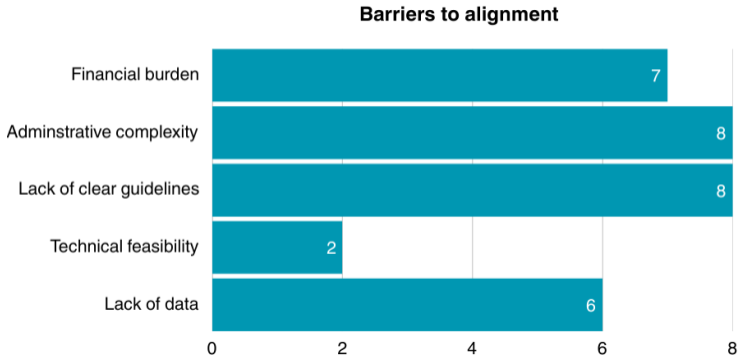
5.5 Barriers to Alignment

The findings indicate that asset managers perceive the process of aligning with the EU Taxonomy as highly challenging. When asked about the overall burden of alignment, most respondents (five out of eight) described it as very burdensome, suggesting that compliance requires significant effort in terms of time, resources, and administrative processes. Two respondents considered the alignment process to be moderately burdensome, while only one respondent found it to be slightly burdensome. These findings highlight that, for most asset managers, achieving Taxonomy compliance is seen as a complex and resource-intensive undertaking.



The specific barriers to alignment further illustrate why compliance is perceived as difficult. The most widely reported obstacles were administrative complexity and the lack of clear guidelines, both cited by all eight respondents. These results suggest that asset managers struggle with interpreting and implementing the regulatory requirements, which adds to the overall compliance burden. Additionally, financial burden was identified as a key challenge by seven respondents, indicating that the costs associated with upgrading assets, hiring consultants, and meeting reporting standards present a significant hurdle.

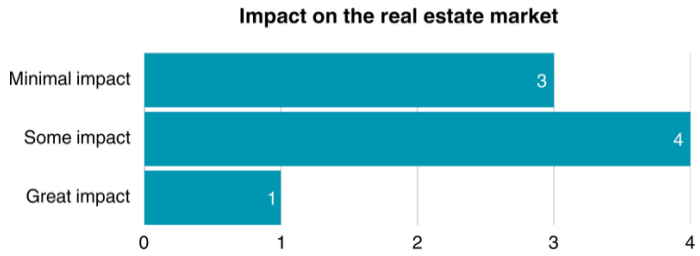
A lack of data was also frequently mentioned, with six respondents stating that obtaining the necessary environmental and financial data for Taxonomy compliance is a challenge. In contrast, technical feasibility was identified as a barrier by only two respondents, indicating that most asset managers do not see technological limitations as a major obstacle. Instead, they view administrative, financial, and regulatory challenges as the primary difficulties in aligning with the EU Taxonomy.



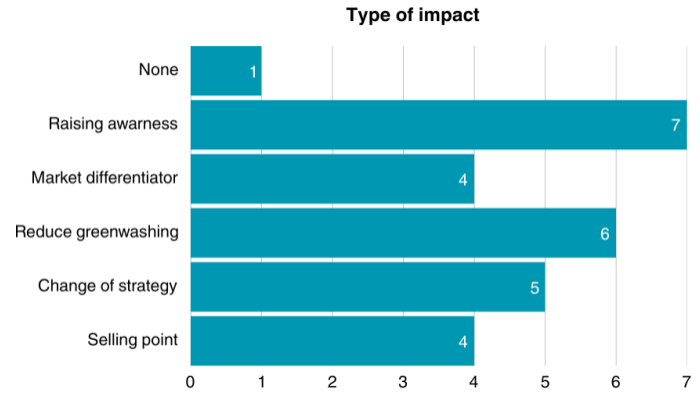
These findings suggest that the burden of alignment is primarily driven by regulatory complexity, financial costs, and data accessibility issues.

5.6 Impact of the EU Taxonomy

The findings indicate that asset managers perceive the impact of the EU Taxonomy on the real estate market to be varied. Most respondents (four out of eight) reported that the Taxonomy has had some impact, suggesting that while it plays a role in shaping investment decisions, its influence is not yet transformative. Three respondents stated that the Taxonomy has had only a minimal impact, indicating that its effects may be limited to specific areas or that compliance remains a secondary consideration for some firms. Only one respondent described the impact as great, suggesting that for a small portion of asset managers, the EU Taxonomy has significantly influenced their strategies and operations.



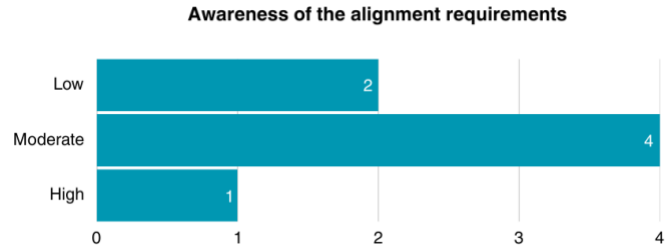
When looking at the type of impact the EU Taxonomy has had, the results show that it is primarily seen as a tool for raising awareness, with seven out of eight respondents identifying this as a key effect. The second most frequently cited impact is its role in reducing greenwashing, with six respondents acknowledging that the Taxonomy has helped create more transparent and credible sustainability claims. Five respondents indicated that it has led to a change in strategy, suggesting that for some asset managers, compliance with the EU Taxonomy has prompted shifts in investment approaches or asset management practices. Additionally, four respondents recognized the Taxonomy as a market differentiator, implying that alignment with its criteria may provide a competitive edge. Similarly, four respondents noted that the EU Taxonomy serves as a selling point, suggesting that compliance can be leveraged to attract investors and stakeholders who prioritize sustainability.



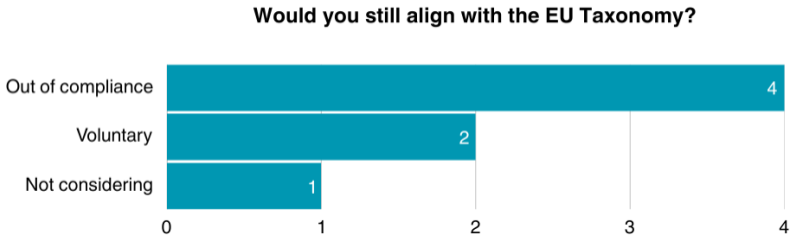
These results suggest that while the EU Taxonomy is contributing to greater awareness and transparency in the real estate sector, its overall impact remains moderate for most asset managers.

5.7 Case Study

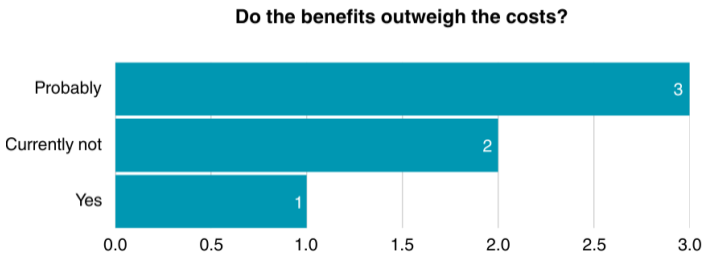
The case study results provide insights into awareness, decision-making, and cost-benefit considerations related to EU Taxonomy alignment among stakeholders. Since the case study was added later in the research process, only six participants were asked about it during interviews. Among the six respondents, four reported a moderate understanding of EU Taxonomy alignment requirements, while two had low awareness. Only one respondent indicated a high level of awareness. This suggests that while most asset managers are somewhat familiar with the requirements, detailed knowledge remains limited, which may impact decision-making.



When asked whether they would still align with the EU Taxonomy despite challenges, four respondents stated they would likely remain out of compliance, while two would align voluntarily. One respondent indicated they were not considering alignment at all. This shows that while some asset managers see value in compliance, others may perceive it as too burdensome or unnecessary.



Regarding the financial feasibility of alignment, three participants believed that the benefits would probably outweigh the costs, while two felt that, at this time, the costs are greater than the potential advantages. Only one respondent was confident that the benefits outweigh the costs. These findings highlight uncertainty about the financial viability of EU Taxonomy alignment, with hesitation stemming from compliance costs and unclear long-term benefits.



Overall, the results suggest that while interest in alignment exists, financial and knowledge barriers remain obstacles to widespread adoption.

6 Discussion

The findings in Chapter 5 are interpreted in this chapter, which also links them to the larger research context of asset managers' familiarity with the EU Taxonomy of Climate Risks.

6.1 Climate Risks

The findings indicate that asset managers are primarily focused on acute weather-related risks such as heat stress and flooding, with sea-level rise and long-term climate risks receiving comparatively less attention. This aligns with the literature, which emphasizes that physical climate risks are increasingly shaping investment strategies (Warren-Myers & Hurlimann, 2022). The research findings also support the argument that asset managers prefer external expertise for climate risk assessment, as seen in the reliance on third-party advisors rather than in-house evaluations.

The limited attention to long-term climate risks such as sea-level rise may be attributed to the investment time horizons of asset managers, which often prioritize short- to mid-term financial returns over long-term sustainability concerns. Additionally, the Netherlands' advanced flood management infrastructure may contribute to a perception that sea-level rise is a manageable risk, reducing its urgency in investment decision-making. However, as regulations change and climate risks become more severe, the need for integrating long-term resilience into investment strategies will likely increase.

The results show that all respondents rely on third-party advisors for climate risk assessments, with only three also using publicly available data, and just one conducting in-house evaluation. This highlights a significant dependence on external expertise, suggesting that asset managers may not have developed the internal capabilities necessary for conducting comprehensive climate risk assessments. The complexity of climate data, combined with the evolving nature of regulatory requirements such as the EU Taxonomy, may discourage asset managers from investing in internal risk assessment capabilities.

An alternative explanation is that outsourcing climate risk assessments is seen as a cost-effective approach, particularly for firms that are not required to conduct continuous monitoring. If asset managers only need to provide climate risk disclosures for regulatory compliance, hiring third-party advisors on an occasional basis may be more financially viable than maintaining an in-house team. However, this reliance on external expertise may limit long-term strategic planning, as asset managers may not fully understand or utilize the data provided by consultants.

6.2 Awareness and Familiarity with the EU Taxonomy

The findings indicate that while asset managers are generally aware of the EU Taxonomy, their familiarity with its specifics varies significantly. This variation in knowledge suggests that while the EU Taxonomy is widely recognized in the industry, its technical details and application remain less understood. These findings align with the discussion in the literature review (Chapter 3), which highlights that sustainability regulations, including the EU Taxonomy, impose complex reporting requirements on financial market participants and asset managers. The EU Taxonomy, introduced as part of the European Green Deal, was designed to establish a common classification system for sustainable investments (European Commission, 2023). However, its relatively recent implementation and the detailed nature of its technical screening criteria present barriers to full comprehension and integration.

The uneven levels of familiarity reported in the results can be attributed to several factors:

1. **Complexity and Technicality of the EU Taxonomy**
   The EU Taxonomy includes detailed criteria that require specialized knowledge in sustainability, environmental science, and financial reporting. The literature review shows that there are many different criteria and compliance factors that must be known to asset managers, which may contribute to the limited understanding observed in the study.

2. **Role and Function of Asset Managers**
   The level of familiarity likely depends on the asset manager's role within their organization. Those who are directly involved in regulatory compliance, reporting, or sustainability strategies are more likely to be familiar with the EU Taxonomy than those primarily engaged in asset acquisition, leasing, or financial performance evaluation. The results indicate that the two respondents who reported high familiarity likely hold positions requiring direct engagement with sustainability frameworks, while the five respondents with partial familiarity may only encounter the EU Taxonomy in the context of broader portfolio management discussions.

3. **Investor type**
   The different investor groups that asset managers work with are also associated with a variance in familiarity. The data suggest that asset managers subject to compulsory compliance, such as pension funds or insurance-based investors, are more actively involved in EU Taxonomy alignment, with several reporting partial alignment or progress. Asset managers who are not currently required to comply (non-forced compliance) demonstrate less alignment. However, some have voluntarily begun the process. This shows that regulatory pressure is a major driver of familiarity and adoption.

As noted in previous sections of the results, asset managers tend to rely heavily on third-party consultants for sustainability assessments and compliance. This reliance may contribute to a lower internal familiarity with the framework, as firms outsource the technical aspects of EU Taxonomy alignment rather than developing in-house expertise.

The results also reveal differences in how frequently asset managers use the EU Taxonomy. Two respondents reported using it monthly, while the majority use it only annually, and one respondent never uses it. The fact that the majority engage with the Taxonomy on an annual basis suggests that its use is primarily tied to compliance and reporting deadlines rather than daily investment decision-making. This also supports the argument that the EU Taxonomy is not yet fully embedded in the investment decision-making process. Instead, it serves as a compliance mechanism that firms reference primarily for regulatory reporting purposes. The two respondents who reported monthly usage may work in organizations that have begun integrating the Taxonomy into strategic decision-making.

6.3 EU Taxonomy Alignment of Climate Risks

The results reveal that asset managers are at different stages of aligning their portfolios with the EU Taxonomy's climate risk criteria. While four out of eight respondents reported that they are partly aligning with the framework, three are only exploring the possibility of alignment, and one has chosen not to align at all. None of the asset managers had a portfolio with full alignment. Additionally, most asset managers conduct alignment checks only after investment decisions rather than incorporating them as a proactive screening tool. These findings suggest that while there is some movement toward Taxonomy compliance, full integration remains inconsistent across the sector. Several factors explain this gradual and uneven alignment:

1. **Regulatory Pressures vs. Voluntary Adoption**
   The EU Taxonomy is a regulatory framework, but not all asset managers are legally required to fully align their portfolios. The literature notes that firms directly affected by the Sustainable Finance Disclosure Regulation (SFDR) and the Corporate Sustainability Reporting Directive (CSRD) have stronger incentives to pursue alignment, which aligns with the literature about coercive pressure (DiMaggio & Powell, 1983; Scott, 1995). In contrast, asset managers operating outside these reporting requirements may see Taxonomy alignment as optional rather than essential, being influenced by either normative or mimetic pressure.

2. **Compliance-Driven rather than Strategy-Driven Alignment**
   The results indicate that for many asset managers, EU Taxonomy compliance is a retrospective rather than proactive measure. Four respondents stated that they check for alignment only after investment decisions have been made. This suggests that instead of using the Taxonomy as a strategic tool to guide initial investment choices, asset managers primarily engage with it during regulatory reporting cycles.

3. **Uncertainty and Lack of Clear Guidance**
   One possible reason for the varied levels of alignment is the complexity and evolving nature of the EU Taxonomy. As mentioned in the literature review, the framework has been frequently updated since its introduction, with ongoing refinements to technical screening criteria (European Commission, 2024). Asset managers may hesitate to fully integrate the Taxonomy into their climate risk strategies if they perceive the criteria as uncertain or subject to change. This reluctance is reinforced by the fact that three respondents reported they are still in the exploratory phase of alignment, suggesting they are waiting for more clarity before committing resources to full compliance.

6.4 Motivation to Compliance

The results indicate that regulatory compliance is the primary driver behind asset managers' alignment with the EU Taxonomy. This aligns with institutional theory, which suggests that organizations respond to coercive pressures from regulatory bodies to maintain legitimacy and avoid penalties (DiMaggio & Powell, 1983). In real estate investment, compliance with the EU Taxonomy has become a legal necessity due to frameworks such as the Sustainable Finance Disclosure Regulation (SFDR) and the Corporate Sustainability Reporting Directive (CSRD). As a result, asset managers primarily align with the Taxonomy to meet external legal expectations rather than out of an intrinsic commitment to sustainability.

The motivation for alignment varies significantly between asset managers working for investors with mandatory reporting obligations and those without. The radar charts illustrate that regulatory compliance is the dominant driver for forced compliance, while future-proofing and market trends play a larger role for voluntary adopters. Asset managers handling real estate for investors subject to SFDR and CSRD requirements must ensure Taxonomy alignment to meet disclosure obligations (European Commission, 2023). This legal pressure makes compliance an obligation rather than a proactive investment strategy, which explains the limited influence of market trends and financial incentives.

In contrast, asset managers without mandatory reporting obligations are more motivated by future-proofing and market trends, with regulatory compliance playing a lesser role. A possible explanation is that investors in these firms may not yet require strict Taxonomy alignment as a prerequisite for investment. If the Taxonomy is perceived as too complex or not fully embedded in market expectations, asset managers may not feel strong external pressure to comply beyond minimum legal requirements. Instead, voluntary adopters of the Taxonomy view alignment as a means of enhancing long-term asset resilience and adapting to shifting market

dynamics. Ensuring compliance allows them to maintain portfolio attractiveness in a changing real estate market.

Another key finding is that competitive advantage is seen as a moderate benefit of Taxonomy alignment but does not appear to be a decisive factor in compliance. While asset managers acknowledge that sustainability-aligned investments can attract high-value tenants and investors, the competitive differentiation provided by Taxonomy compliance is not yet strong enough to drive voluntary adoption. This suggests that, at present, alignment is primarily viewed as a legal requirement rather than a strategic move. However, as sustainability regulations become more ingrained in financial decision-making, compliance may offer a greater competitive edge in the future.

The findings also reveal that risk reduction is not a dominant motivator for alignment, despite the EU Taxonomy's goal of encouraging financial actors to incorporate climate risks into their portfolios. This may indicate that asset managers still perceive climate risks as secondary to financial considerations. Alternatively, some may believe they are already addressing these risks through internal frameworks and, therefore, do not see additional value in aligning with the EU Taxonomy.

6.5 Barriers to Alignment

The findings indicate that asset managers perceive aligning with the EU Taxonomy as a highly burdensome process, primarily due to regulatory complexity, financial costs, and data availability issues. The EU Taxonomy's detailed technical screening criteria and extensive reporting requirements create a compliance landscape that many asset managers find overwhelming.

A key challenge is the administrative complexity of the EU Taxonomy. The reliance on external expertise, as seen in the findings, suggests that asset managers may not have the in-house knowledge to navigate the EU Taxonomy compliance efficiently. This dependence on third-party expertise increases costs. Financial costs also present a significant hurdle, with most asset managers viewing alignment as an expensive undertaking. Retrofitting buildings to while aligning with EU Taxonomy requirements, ensuring data collection and verification, and hiring external advisors all contribute to the financial burden of compliance. The case study has shown that the upfront costs solely for construction can already be 5-10,6% higher, the upfront costs associated with regulatory alignment can discourage firms from pursuing full compliance.

A related issue is the challenge of data availability. Asset managers frequently struggle to obtain the necessary environmental and financial data to assess their portfolios against Taxonomy criteria. The results indicate that a lack of reliable data is a key barrier to compliance. Many real estate assets, particularly older buildings, were not designed with sustainability reporting in mind, making it difficult to obtain accurate performance metrics. Additionally, asset managers may rely on property owners, tenants, or external service providers for data, leading to inconsistencies and gaps in reporting. Without access to high-quality, standardized data, achieving EU Taxonomy alignment becomes difficult and costly.

Technical feasibility is not seen as a major barrier, suggesting that asset managers believe Taxonomy compliance is structurally possible but administratively and financially challenging.

An alternative explanation for the resistance to compliance is that asset managers may not yet perceive sufficient market advantages to justify the effort. Institutional theory suggests (DiMaggio & Powell, 1983) that firms tend to adopt new regulatory frameworks when they see clear benefits in terms of market competitiveness or investor demand. If asset managers believe that Taxonomy alignment does not yet offer a competitive edge or that investors are not actively prioritizing compliance, they may be less motivated to overcome the associated

barriers. This could explain why some firms are hesitant to fully commit to alignment, even if they recognize the long-term benefits of sustainability integration.

6.6 Impact of the EU Taxonomy

The results indicate that the EU Taxonomy has had a limited but growing impact on the real estate market. While most asset managers reported that the framework has had "some impact," a significant portion still perceives its influence as minimal. Only one respondent described the Taxonomy's impact as "great," suggesting that its full integration into investment decision-making and market behaviour remains a work in progress.

One of the most significant impacts of the EU Taxonomy appears to be raising awareness, with most asset managers recognizing its role in increasing knowledge about sustainability requirements. However, awareness alone does not necessarily translate into action, which may explain why the reported market impact remains moderate. Reducing greenwashing is another key impact, with several respondents acknowledging that the EU Taxonomy has helped establish clearer definitions for sustainable investments, which is the goal of the EU Taxonomy (European Commission, 2023)

Beyond awareness and transparency, the results indicate that the EU Taxonomy is beginning to shape investment strategies, with some asset managers reporting that it has influenced their decision-making processes. However, the fact that only a portion of asset managers have adjusted their strategies in response to the Taxonomy suggests that its influence has not yet reached a tipping point where it dictates mainstream market behaviour.

The Taxonomy's role as a market differentiator and selling point is also notable, with some asset managers recognizing that compliance can offer competitive advantages. This finding aligns with research indicating that sustainability-aligned assets are becoming more attractive to investors and tenants, particularly as regulatory pressure and market expectations change (PWC, 2023). An alternative explanation for the limited perceived impact of the EU Taxonomy is that the real estate market has not yet fully internalized its requirements. If enforcement mechanisms strengthen and investor demand for compliance increases, the Taxonomy's role in shaping real estate investment strategies may become more prominent.

6.7 Case Study

The case study examined in Chapter 4 provides insights into how asset managers assess EU Taxonomy compliance when evaluating a renovation project. The results reveal a clear disconnect between asset managers' willingness to align with the Taxonomy and their perception of its long-term benefits. While most respondents indicated they would not align, a few remained open to compliance. However, a slight majority still believed that the long-term benefits of sustainability improvements outweigh the costs. This suggests that while asset managers see financial value in climate adaptation measures, they remain hesitant about formal EU Taxonomy alignment due to the associated administrative and regulatory burdens.

A key reason for this distinction is that asset managers do not attribute financial benefits to EU Taxonomy compliance itself, but rather to sustainability improvements made during renovations. Energy-efficient upgrades reduce operational costs, lower energy demand, and increase property appeal, allowing for higher rental income. These direct financial gains are clear and measurable. In contrast, the compliance process—including reporting obligations, documentation, and verification of alignment with technical screening criteria—is seen as an added burden with no immediate financial return.

Overall, the case study highlights the broader challenges identified in this research: while the EU Taxonomy is recognized as an important regulatory framework, its adoption is still hindered by financial constraints, administrative complexity, and varying levels of familiarity among asset

managers. The mixed responses regarding compliance suggest that market conditions, institutional priorities, and regulatory clarity will continue to shape whether and to what extent the EU Taxonomy becomes fully integrated into real estate investment strategies.

6.8 Evolution of the Study Approach

Initially, the study focused solely on office real estate. However, securing interviews with office asset managers proved challenging. Many were unavailable, did not see themselves as the right experts on the topic, or relied on external consultants for sustainability compliance. To ensure a broader and more representative dataset, the scope was expanded to include asset managers from residential, retail, and mixed-use real estate. This adjustment allowed for more insights and a better understanding of how different real estate sectors approach climate risks and compliance. While this shift made the study more comprehensive, it also meant that office real estate was no longer the sole focus. The findings now apply to a wider range of real estate professionals. Future research could take a deeper dive into office real estate.

6.9 Limitations

This study has several limitations. First, while the research provides insights into real estate asset managers' engagement with the EU Taxonomy, the findings are based on a limited number of interviews, which may not fully capture all perspectives in the industry. Second, the complexity of the EU Taxonomy means that interpretations of compliance may vary among participants, potentially affecting the consistency of responses.

Additionally, the study focuses on qualitative insights, meaning that the financial impacts of alignment were not analysed in-depth. The case study provides an example of potential costs and benefits, but generalizability remains limited. Finally, as the EU Taxonomy is still evolving, future regulatory updates may influence how asset managers approach compliance, making some findings time sensitive.

7 Conclusion

This research set out to explore how familiar real estate asset managers are with the EU Taxonomy's regulations concerning climate risks and the extent to which they incorporate its criteria into their investment decisions. The findings reveal that while asset managers are broadly aware of the Taxonomy, their familiarity with its specific requirements remains inconsistent. Compliance is largely driven by regulatory obligations rather than a proactive strategic approach, and significant barriers, such as administrative complexity, financial costs, and data limitations, continue to hinder full alignment. The research also highlights that while the EU Taxonomy is gradually shaping awareness and transparency in the real estate sector, its direct market impact remains limited at this stage.

7.1 Research questions

SQ 1: What specific climate risks are relevant to existing real estate?

As discussed in the literature review, climate risks in real estate can be categorized into physical risks, such as flooding, storms, extreme heat, and sea-level rise, and transition risks, including regulatory changes, market expectations, and reputational concerns. These risks have significant financial and operational implications for asset managers, requiring adaptation strategies to maintain asset value and investment stability.

> The findings of this research indicate that asset managers primarily focus on acute physical risks like heat stress and flooding, while long-term risks, such as sea-level rise, receive less attention. This reflects a short-term investment mindset that prioritizes immediate financial returns. Additionally, the Netherlands' advanced flood management infrastructure may contribute to a perception that sea-level rise is a manageable risk, reducing its urgency in decision-making.

Moreover, asset managers tend to rely on third-party advisors for climate risk assessments rather than conducting in-house evaluations, indicating a lack of internal expertise in climate risk management. While climate risks are recognized, they are often assessed externally, aligning with the broader industry trend of outsourcing sustainability expertise due to regulatory complexity. As regulatory pressures increase and investor expectations shift, the integration of long-term resilience strategies will likely become more critical.

SQ 2: How do asset managers align climate risk measures with the EU Taxonomy?

The findings indicate that asset managers are at different stages of alignment, with most engaging in partial compliance or still exploring the possibility of alignment. None of the respondents reported full portfolio alignment. Furthermore, alignment is primarily a retrospective process, with most asset managers assessing Taxonomy compliance only after investment decisions have been made, rather than using it as a proactive screening tool. This suggests that, for many firms, compliance remains a reporting exercise rather than a guiding principle in investment strategies.

SQ 3: What motivates real estate asset managers to incorporate economic activities in alignment with the EU Taxonomy?

Regulatory compliance is the primary motivation for alignment, especially for asset managers handling portfolios subject to SFDR and CSRD reporting obligations. In cases where compliance is voluntary, future-proofing and market trends play a more significant role. However, competitive advantage is not yet a decisive factor in driving Taxonomy adoption, suggesting that sustainability differentiation is not yet fully embedded in market expectations.

SQ 4: What challenges do asset managers face in complying with the EU Taxonomy's criteria?

Asset managers face three key challenges: administrative complexity, financial costs, and data availability issues. The EU Taxonomy's detailed technical screening criteria require specialized knowledge, and many asset managers rely on external consultants to navigate compliance. The financial burden of Taxonomy alignment, including the costs of retrofitting buildings and hiring compliance experts, is another major concern. Additionally, asset managers struggle to access the environmental and performance data necessary for compliance, particularly for older buildings that lack standardized sustainability reporting mechanisms.

SQ 5: Would the asset manager still choose EU Taxonomy alignment after assessing its costs and administrative burden in the case study?

The case study results revealed a divide among asset managers. Half of the respondents stated they would still choose to align with the EU Taxonomy after reviewing its requirements, while the other half would not. However, when asked whether the benefits outweigh the costs, the majority agreed that sustainability measures ultimately provide financial advantages. This distinction suggests that asset managers perceive the financial returns as stemming from the sustainability measures themselves, such as energy efficiency improvements and higher rental demand, rather than from Taxonomy compliance as a process. This further reinforces the view that while sustainability is recognized as beneficial, the administrative effort required for regulatory alignment remains a deterrent.

7.2 Main research question

MRQ: How familiar are real estate asset managers with the regulations of the EU Taxonomy concerning climate risks?

The research findings indicate that while asset managers have a general awareness of the EU Taxonomy, their familiarity with its specific climate risk criteria is limited and varies depending on their role, investor type, and exposure to regulatory obligations. Asset managers working with institutional investors subject to SFDR and CSRD tend to be more knowledgeable about the Taxonomy, as they must comply with mandatory reporting requirements. However, even among these firms, the technical complexity of the Taxonomy remains a challenge, and compliance is often outsourced to third-party consultants rather than handled in-house.

For asset managers who are not legally required to comply, familiarity with the Taxonomy is lower, and alignment is primarily considered for strategic positioning or future-proofing rather than immediate implementation. The findings suggest that the EU Taxonomy is not yet fully integrated into investment decision-making processes, with many asset managers engaging with it only for reporting purposes rather than as a framework for proactive climate risk management. Additionally, the reliance on external advisors for climate risk assessments further indicates that asset managers have not yet developed strong internal expertise in aligning with the Taxonomy.

Overall, while real estate asset managers recognize the EU Taxonomy as an important regulatory framework, their understanding of its detailed requirements for climate risk alignment remains limited. This knowledge gap, combined with administrative and financial barriers, suggests that the EU Taxonomy is currently more of a compliance obligation than a transformative tool for climate risk integration. However, as regulatory enforcement strengthens and market expectations shift, asset managers may need to enhance their familiarity with the Taxonomy to ensure long-term portfolio resilience and competitiveness.

8 Recommendations

Based on the findings of this research, several recommendations can be made to improve the effectiveness of the EU Taxonomy's implementation in the real estate sector. These recommendations focus on addressing the barriers identified in this study, enhancing the practical applicability of the Taxonomy, and ensuring that asset managers can better integrate sustainability criteria into their investment strategies.

8.1 Improving Awareness and Knowledge of the EU Taxonomy

The research shows that while asset managers are generally aware of the EU Taxonomy, their familiarity with its specific requirements remains limited. To enhance understanding and encourage better integration, the following measures should be considered:

- **Targeted Training Programs**: Industry associations, financial regulators, and sustainability advisory firms should develop targeted training sessions and certification programs to educate asset managers on the EU Taxonomy's criteria, reporting obligations, and strategic applications.

- **Guidance Tailored to Real Estate**: The European Commission should issue sector-specific guidelines that simplify the technical screening criteria for real estate investments, making it easier for asset managers to assess compliance.

8.2 Streamlining Administrative and Reporting Burdens

One of the key barriers identified in this research is the complexity of the EU Taxonomy's reporting requirements, which many asset managers view as burdensome. To reduce administrative challenges and improve compliance efficiency, the following steps should be taken:

- **Integration with Existing ESG Reporting Frameworks**: Aligning EU Taxonomy reporting requirements with existing ESG standards, such as GRESB, BREEAM, LEED etc., could reduce duplication and make compliance more efficient for asset managers already engaged in sustainability reporting.

- **Regulatory Clarity and Stability**: Policymakers should ensure that the EU Taxonomy criteria remain stable over time to provide asset managers with certainty about alignment expectations and reduce the hesitancy caused by frequent regulatory updates.

8.3 Enhancing Financial Incentives for Alignment

The research indicates that asset managers recognize the financial benefits of sustainability measures but do not necessarily attribute these benefits to EU Taxonomy compliance. To encourage broader adoption of the Taxonomy, financial incentives should be strengthened:

- **Green Financing and Tax Incentives**: Governments and financial institutions should expand access to green loans, preferential financing rates, and tax incentives for investments that meet EU Taxonomy criteria.

- **Valuation Premiums for Taxonomy-Aligned Assets**: Investors and valuation experts should work towards recognizing the added value of Taxonomy-aligned real estate in financial appraisals, reinforcing the business case for compliance.

8.4 Improving Data Availability and Quality

A significant barrier to Taxonomy alignment is the lack of reliable, standardized data on building performance and climate risks. To address this issue, the following action is recommended:

- **Standardized Sustainability Data Collection**: Real estate stakeholders should work towards creating standardized data collection methodologies for key performance indicators such as energy efficiency, embodied carbon, and resilience to climate risks.

8.5 Shifting from Compliance-Driven to Strategy-Driven Alignment

Currently, many asset managers treat EU Taxonomy compliance as a reporting obligation rather than a strategic investment tool. To encourage a shift towards more proactive sustainability integration, the following measures should be considered:

- **Embedding Taxonomy Alignment into Investment Strategies**: Instead of assessing alignment after key decisions have been made, real estate firms should incorporate EU Taxonomy considerations at the earliest stages of the investment or renovation process, such as acquisition, due diligence, and concept design.

- **Encouraging Adoption Beyond Regulatory Obligations**: While legal pressure is now the primary driver of compliance, market dynamics like investor demand, tenant preferences, and reputational benefits could be used to position EU Taxonomy conformance as a competitive advantage rather than an obligation.

- **Promoting Proactive Use and Early-Stage Incentives:** To achieve the EU Taxonomy's ultimate purpose of improving sustainability and encouraging real climate-adaptive investments, the framework must grow into a more proactive classification system. This necessitates explicit incentives for investors to verify alignment requirements before beginning repairs. There should also be greater opportunities and support for taking advantage of EU Taxonomy alignment as a visible marketing asset, both to attract sustainable funding and to communicate long-term value to tenants and stakeholders.

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AI Note: The scientific search platform Consensus was used to find sources. Grammarly was used to check grammar and language level. ChatGPT was used to rewrite parts of the text to improve the academic tone, while preserving the original content.

10 Appendix

10.1 Appendix 1

See corresponding file uploaded.

10.2 Appendix 2

See corresponding file uploaded.

10.3 Appendix 3

See corresponding file uploaded.

APPENDIX A: GENERIC CRITERIA FOR DNSH TO CLIMATE CHANGE ADAPTATION

I. Criteria

The physical climate risks that are material to the activity have been identified from those listed in the table in Section II of this Appendix by performing a robust climate risk and vulnerability assessment with the following steps:

(a) screening of the activity to identify which physical climate risks from the list in Section II of this Appendix may affect the performance of the economic activity during its expected lifetime;

(b) where the activity is assessed to be at risk from one or more of the physical climate risks listed in Section II of this Appendix, a climate risk and vulnerability assessment to assess the materiality of the physical climate risks on the economic activity;

(c) an assessment of adaptation solutions that can reduce the identified physical climate risk.

The climate risk and vulnerability assessment is proportionate to the scale of the activity and its expected lifespan, such that:

(a) for activities with an expected lifespan of less than 10 years, the assessment is performed, at least by using climate projections at the smallest appropriate scale;

(b) for all other activities, the assessment is performed using the highest available resolution, state-of-the-art climate projections across the existing range of future scenarios[320] consistent with the expected lifetime of the activity, including, at least, 10 to 30 year climate projections scenarios for major investments.

The climate projections and assessment of impacts are based on best practice and available guidance and take into account the state-of-the-art science for vulnerability and risk analysis and related methodologies in line with the most recent Intergovernmental Panel on Climate Change reports[321], scientific peer-reviewed publications, and open source[322] or paying models.

For existing activities and new activities using existing physical assets, the economic operator implements physical and non-physical solutions ('adaptation solutions'), over a period of time of up to five years, that reduce the most important identified physical climate risks that are material to that activity. An adaptation plan for the implementation of those solutions is drawn up accordingly.

For new activities and existing activities using newly-built physical assets, the economic operator integrates the adaptation solutions that reduce the most important identified physical climate risks that are material to that activity at the time of design and construction and has implemented them before the start of operations.

The adaptation solutions implemented do not adversely affect the adaptation efforts or the level of resilience to physical climate risks of other people, of nature, of cultural heritage, of assets and of

320 Future scenarios include Intergovernmental Panel on Climate Change representative concentration pathways RCP2.6, RCP4.5, RCP6.0 and RCP8.5.

321 Assessments Reports on Climate Change: Impacts, Adaptation and Vulnerability, published periodically by the Intergovernmental Panel on Climate Change (IPCC), the United Nations body for assessing the science related to climate change produces, https://www.ipcc.ch/reports/.

322 Such as Copernicus services managed by the European Commission.

other economic activities; are consistent with local, sectoral, regional or national adaptation strategies and plans; and consider the use of nature-based solutions[323] or rely on blue or green infrastructure[324] to the extent possible.

II. Classification of climate-related hazards[325]

	Temperature-related	**Wind-related**	**Water-related**	**Solid mass-related**
Chronic	Changing temperature (air, freshwater, marine water)	Changing wind patterns	Changing precipitation patterns and types (rain, hail, snow/ice)	Coastal erosion
	Heat stress		Precipitation or hydrological variability	Soil degradation
	Temperature variability		Ocean acidification	Soil erosion
	Permafrost thawing		Saline intrusion	Solifluction
			Sea level rise	
			Water stress	
Acute	Heat wave	Cyclone, hurricane, typhoon	Drought	Avalanche
	Cold wave/frost	Storm (including blizzards, dust and sandstorms)	Heavy precipitation (rain, hail, snow/ice)	Landslide
	Wildfire	Tornado	Flood (coastal, fluvial, pluvial, ground water)	Subsidence
			Glacial lake outburst	

323 Nature-based solutions are defined as 'solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions'. Therefore, nature-based solutions benefit biodiversity and support the delivery of a range of ecosystem services. (version of [adoption date]: https://ec.europa.eu/research/environment/index.cfm?pg=nbs).

324 See Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Green Infrastructure (GI) — Enhancing Europe's Natural Capital (COM/2013/0249 final).

325 The list of climate-related hazards in this table is non-exhaustive, and constitutes only an indicative list of most widespread hazards that are to be taken into account as a minimum in the climate risk and vulnerability assessment.

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)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 114 thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee ([1]),

Acting in accordance with the ordinary legislative procedure ([2]),

Whereas:

(1) Article 3(3) of the Treaty on European Union aims to establish an internal market that works for the sustainable development of Europe, based, among other things, on balanced economic growth and a high level of protection and the improvement of the quality of the environment.

(2) On 25 September 2015, the UN General Assembly adopted a new global sustainable development framework: the 2030 Agenda for Sustainable Development (the '2030 Agenda'). The 2030 Agenda has at its core the Sustainable Development Goals (SDGs) and covers the three dimensions of sustainability: economic, social and environmental. The Commission communication of 22 November 2016 on the next steps for a sustainable European future links the SDGs to the Union policy framework to ensure that all Union actions and policy initiatives, both within the Union and globally, take the SDGs on board at the outset. In its conclusions of 20 June 2017 the Council confirmed the commitment of the Union and its Member States to the implementation of the 2030 Agenda in a full, coherent, comprehensive, integrated and effective manner, in close cooperation with partners and other stakeholders. On 11 December 2019, the Commission published its communication on 'The European Green Deal'.

(3) The Paris Agreement adopted under the United Nations Framework Convention on Climate Change (the 'Paris Agreement') was approved by the Union on 5 October 2016 ([3]). Article 2(1)(c) of the Paris Agreement aims to strengthen the response to climate change by making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development, among other means. In that context, on 12 December 2019, the European Council adopted conclusions on climate change. In light thereof, this Regulation represents a key step towards the objective of achieving a climate-neutral Union by 2050.

(4) Sustainability and the transition to a safe, climate-neutral, climate-resilient, more resource-efficient and circular economy are crucial to ensuring the long-term competitiveness of the Union economy. Sustainability has long been central to the Union project, and the Treaty on European Union and the Treaty on the Functioning of the European Union (TFEU) reflect its social and environmental dimensions.

([1]) OJ C 62, 15.2.2019, p. 103.

([2]) Position of the European Parliament of 28 March 2019 (not yet published in the Official Journal) and Position of the Council at first reading of 15 April 2020 (OJ C 184, 3.6.2020, p. 1). Position of the European Parliament of 17 June 2020 (not yet published in the Official Journal).

([3]) Council Decision (EU) 2016/1841 of 5 October 2016 on the conclusion, on behalf of the European Union, of the Paris Agreement adopted under the United Nations Framework Convention on Climate Change (OJ L 282, 19.10.2016, p. 1).

(5) In December 2016, the Commission mandated a High-Level Expert Group to develop an overarching and comprehensive Union strategy on sustainable finance. The report of the High-Level Expert Group published on 31 January 2018 calls for the creation of a technically robust classification system at Union level to establish clarity on which activities qualify as 'green' or 'sustainable', starting with climate change mitigation.

(6) In its communication of 8 March 2018, the Commission published its action plan on financing sustainable growth, launching an ambitious and comprehensive strategy on sustainable finance. One of the objectives set out in that action plan is to reorient capital flows towards sustainable investment in order to achieve sustainable and inclusive growth. The establishment of a unified classification system for sustainable activities is the most important and urgent action envisaged by the action plan. The action plan recognises that the shift of capital flows towards more sustainable activities has to be underpinned by a shared, holistic understanding of the environmental sustainability of activities and investments. As a first step, clear guidance on activities that qualify as contributing to environmental objectives would help inform investors about the investments that fund environmentally sustainable economic activities. Further guidance on activities that contribute to other sustainability objectives, including social objectives, might be developed at a later stage.

(7) Given the systemic nature of global environmental challenges, there is a need for a systemic and forward-looking approach to environmental sustainability that addresses growing negative trends, such as climate change, the loss of biodiversity, the global overconsumption of resources, food scarcity, ozone depletion, ocean acidification, the deterioration of the fresh water system, and land system change as well as the appearance of new threats, such as hazardous chemicals and their combined effects.

(8) Decision No 1386/2013/EU of the European Parliament and of the Council ([4]) calls for an increase in private sector funding for environmental and climate-related expenditure, in particular by putting in place incentives and methodologies that stimulate companies to measure the environmental costs of their business and profits derived from using environmental services.

(9) Achieving the SDGs in the Union requires the channelling of capital flows towards sustainable investments. It is important to fully exploit the potential of the internal market to achieve those goals. In that context, it is crucial to remove obstacles to the efficient movement of capital into sustainable investments in the internal market and to prevent new obstacles from emerging.

(10) In view of the scale of the challenge and the costs associated with inaction or delayed action, the financial system should be gradually adapted in order to support the sustainable functioning of the economy. To that end, sustainable finance needs to become mainstream and consideration needs to be given to the sustainability impact of financial products and services.

(11) Making available financial products which pursue environmentally sustainable objectives is an effective way of channelling private investments into sustainable activities. Requirements for marketing financial products or corporate bonds as environmentally sustainable investments, including requirements set by Member States and the Union to allow financial market participants and issuers to use national labels, aim to enhance investor confidence and awareness of the environmental impact of those financial products or corporate bonds, to create visibility and to address concerns about 'greenwashing'. In the context of this Regulation, greenwashing refers to the practice of gaining an unfair competitive advantage by marketing a financial product as environmentally friendly, when in fact basic environmental standards have not been met. Currently, a few Member States have labelling schemes in place. Those existing schemes build on different classification systems for environmentally sustainable economic activities. Given the political commitments under the Paris Agreement and at Union level, it is likely that more and more Member States will establish labelling schemes or impose other requirements on financial market participants or issuers in respect of promoting financial products or corporate bonds as environmentally sustainable. In such cases, Member States would use their own national classification systems for the purposes of determining which

([4]) Decision No 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet' (OJ L 354, 28.12.2013, p. 171).

investments qualify as sustainable. If those national labelling schemes or requirements use different criteria to determine which economic activities qualify as environmentally sustainable, investors would be discouraged from investing across borders due to difficulties in comparing different investment opportunities. In addition, economic operators that wish to attract investment from across the Union would have to meet different criteria in different Member States in order for their activities to qualify as environmentally sustainable. The absence of uniform criteria would therefore increase costs and significantly disincentivise economic operators from accessing cross-border capital markets for the purposes of sustainable investment.

(12) The criteria for determining whether an economic activity qualifies as environmentally sustainable should be harmonised at Union level in order to remove barriers to the functioning of the internal market with regard to raising funds for sustainability projects, and to prevent the future emergence of barriers to such projects. With such harmonisation, economic operators would find it easier to raise funding across borders for their environmentally sustainable activities, as their economic activities could be compared against uniform criteria in order to be selected as underlying assets for environmentally sustainable investments. Such harmonisation would therefore facilitate cross-border sustainable investment in the Union.

(13) If financial market participants do not provide any explanation to investors about how the activities in which they invest contribute to environmental objectives, or if financial market participants use different concepts in their explanations of what an environmentally sustainable economic activity is, investors will find it disproportionately burdensome to check and compare different financial products. It has been found that such practices discourage investors from investing in environmentally sustainable financial products. Furthermore, a lack of investor confidence has a major detrimental impact on the market for sustainable investment. It has also been shown that national rules and market-based initiatives taken to tackle that issue within national borders lead to the fragmentation of the internal market. If financial market participants disclose how and to what extent the financial products that are made available as environmentally sustainable invest in activities that meet the criteria for environmentally sustainable economic activities under this Regulation, and if financial market participants use common criteria for such disclosures across the Union, that would help investors compare investment opportunities across borders and would incentivise investee companies to make their business models more environmentally sustainable. Additionally, investors would invest in environmentally sustainable financial products across the Union with higher confidence, thereby improving the functioning of the internal market.

(14) To address existing obstacles to the functioning of the internal market and to prevent the emergence of such obstacles in the future, Member States and the Union should be required to use a common concept of environmentally sustainable investment when introducing requirements at national and Union level regarding financial market participants or issuers for the purpose of labelling financial products or corporate bonds that are marketed as environmentally sustainable. To avoid market fragmentation and harm to the interests of consumers and investors as a result of diverging notions of environmentally sustainable economic activities, national requirements that financial market participants or issuers have to comply with in order to market financial products or corporate bonds as environmentally sustainable should build on the uniform criteria for environmentally sustainable economic activities. Such financial market participants and issuers include financial market participants that make available environmentally sustainable financial products and non-financial companies that issue environmentally sustainable corporate bonds.

(15) Establishing criteria for environmentally sustainable economic activities may encourage economic operators not covered by this Regulation, on a voluntary basis, to publish and disclose information on their websites regarding the environmentally sustainable economic activities they carry out. That information will not only help financial market participants and other relevant actors on the financial markets to easily identify which economic operators carry out environmentally sustainable economic activities, but will also make it easier for those economic operators to raise funding for their environmentally sustainable activities.

(16) A classification of environmentally sustainable economic activities at Union level should enable the development of future Union policies in support of sustainable finance, including Union-wide standards for environmentally sustainable financial products and the eventual establishment of labels that formally recognise compliance with those standards across the Union. It could also serve as the basis for other economic and regulatory measures. Uniform legal requirements for determining the degree of environmental sustainability of investments, based on uniform criteria for environmentally sustainable economic activities, are necessary as a reference for future Union law that aims to facilitate the shift of investment towards environmentally sustainable economic activities.

(17) In the context of achieving the SDGs in the Union, policy choices such as the creation of a European Fund for Strategic Investment, have been effective in contributing to the channelling of private investment towards sustainable investments alongside public spending. Regulation (EU) 2015/1017 of the European Parliament and of the Council ([5]) specifies a 40 % climate investment target for infrastructure and innovation projects under the European Fund for Strategic Investment. Common criteria for determining whether economic activities qualify as sustainable, including their impact on the environment, could underpin future similar initiatives of the Union to mobilise investment that pursues climate-related or other environmental objectives.

(18) To avoid harming investor interests, fund managers and institutional investors that make available financial products should disclose how and to what extent they use the criteria for environmentally sustainable economic activities to determine the environmental sustainability of their investments. The information disclosed should enable investors to understand the proportion of the investments underlying the financial product in environmentally sustainable economic activities as a percentage of all investments underlying that financial product, thereby enabling investors to understand the degree of environmental sustainability of the investment. Where the investments underlying the financial product are in economic activities that contribute to an environmental objective, the information to be disclosed should specify the environmental objective or objectives to which the investment underlying the financial product contributes, as well as how and to what extent the investments underlying the financial product fund environmentally sustainable economic activities, and should include details on the respective proportions of enabling and transitional activities. The Commission should specify the information that needs to be disclosed in that regard. That information should enable national competent authorities to easily verify compliance with that disclosure obligation, and to enforce such compliance in accordance with applicable national law. Where financial market participants do not take the criteria for environmentally sustainable investments into account, they should provide a statement to that end. To avoid the circumvention of the disclosure obligation, that obligation should also apply where financial products are marketed as promoting environmental characteristics, including financial products that have as their objective environmental protection in a broad sense.

(19) The disclosure obligations laid down in this Regulation supplement the rules on sustainability-related disclosures laid down in Regulation (EU) 2019/2088 of the European Parliament and of the Council ([6]). To enhance transparency and to provide an objective point of comparison by financial market participants to end investors on the proportion of investments that fund environmentally sustainable economic activities, this Regulation supplements the rules on transparency in pre-contractual disclosures and in periodic reports laid down in Regulation (EU) 2019/2088. The definition of 'sustainable investment' in Regulation (EU) 2019/2088 includes investments in economic activities that contribute to an environmental objective which, amongst others, should include investments into 'environmentally sustainable economic activities' within the meaning of this Regulation. Moreover, Regulation (EU) 2019/2088 only considers an investment to be a sustainable investment if it does not significantly harm any environmental or social objective as set out in that Regulation.

([5]) Regulation (EU) 2015/1017 of the European Parliament and of the Council of 25 June 2015 on the European Fund for Strategic Investments, the European Investment Advisory Hub and the European Investment Project Portal and amending Regulations (EU) No 1291/2013 and (EU) No 1316/2013 – the European Fund for Strategic Investments (OJ L 169, 1.7.2015, p. 1).

([6]) Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector (OJ L 317, 9.12.2019, p. 1).

(20) To ensure the reliability, consistency and comparability of sustainability-related disclosures in the financial services sector, disclosures pursuant to this Regulation should use existing sustainability indicators to the extent feasible as proposed by the European Parliament in its resolution of 29 May 2018 on sustainable finance ([7]). In that context, the technical screening criteria should, to the extent feasible, be based on the sustainability indicators referred to in Regulation (EU) 2019/2088.

(21) Regarding economic activities carried out by undertakings that are not required to disclose information under this Regulation, there could be exceptional cases where financial market participants cannot reasonably obtain the relevant information to reliably determine the alignment with the technical screening criteria established pursuant to this Regulation. In such exceptional cases and only for those economic activities for which complete, reliable and timely information could not be obtained, financial market participants should be allowed to make complementary assessments and estimates on the basis of information from other sources. Such assessments and estimates should only compensate for limited and specific parts of the desired data elements, and produce a prudent outcome. In order to ensure that the disclosure to investors is clear and not misleading, financial market participants should clearly explain the basis for their conclusions as well as the reasons for having to make such complementary assessments and estimates for the purposes of disclosure to end investors.

(22) In its communication of 20 June 2019 on 'Guidelines on non-financial reporting: Supplement on reporting climate-related information', the Commission recommends that certain large companies report on certain climate-related key performance indicators (KPIs) that are based on the framework established by this Regulation. In particular, information on the proportion of the turnover, capital expenditure (CapEx) or operating expenditure (OpEx) of such large non-financial companies that is associated with environmentally sustainable economic activities, as well as KPIs that are tailored for large financial companies, is useful to investors who are interested in companies whose products and services contribute substantially to any one of the environmental objectives set out in this Regulation. It is therefore appropriate to require the annual publication of such KPIs by such large companies and to further define that requirement in delegated acts, in particular with regard to large financial companies. While it would be disproportionately burdensome to extend such a requirement to smaller companies, smaller companies may voluntarily decide to publish such information.

(23) For the purpose of determining the environmental sustainability of a given economic activity, an exhaustive list of environmental objectives should be laid down. The six environmental objectives that this Regulation should cover are: climate change mitigation; climate change adaptation; the sustainable use and protection of water and marine resources; the transition to a circular economy; pollution prevention and control; and the protection and restoration of biodiversity and ecosystems.

(24) An economic activity that pursues the environmental objective of climate change mitigation should contribute substantially to the stabilisation of greenhouse gas emissions by avoiding or reducing them or by enhancing greenhouse gas removals. The economic activity should be consistent with the long-term temperature goal of the Paris Agreement. That environmental objective should be interpreted in accordance with relevant Union law, including Directive 2009/31/EC of the European Parliament and of the Council ([8]).

(25) An economic activity that pursues the environmental objective of climate change adaptation should contribute substantially to reducing or preventing the adverse impact of the current or expected future climate, or the risks of such adverse impact, whether on that activity itself or on people, nature or assets. That environmental objective should be interpreted in accordance with relevant Union law and the Sendai Framework for Disaster Risk Reduction 2015–2030.

([7]) OJ C 76, 9.3.2020, p. 23.

([8]) Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 (OJ L 140, 5.6.2009, p. 114).

(26) The environmental objective of the sustainable use and protection of water and marine resources should be interpreted in accordance with relevant Union law, including Regulation (EU) No 1380/2013 of the European Parliament and of the Council ([9]) and Directives 2000/60/EC ([10]), 2006/7/EC ([11]), 2006/118/EC ([12]), 2008/56/EC ([13]) and 2008/105/EC ([14]) of the European Parliament and of the Council, Council Directives 91/271/EEC ([15]), 91/676/EEC ([16]) and 98/83/EC ([17]) and Commission Decision (EU) 2017/848 ([18]), and with the communications of the Commission of 18 July 2007 on 'Addressing the challenge of water scarcity and droughts in the European Union', of 14 November 2012 on 'A Blueprint to Safeguard Europe's Water Resources' and of 11 March 2019 on 'European Union Strategic Approach to Pharmaceuticals in the Environment'.

(27) The environmental objective of the transition to a circular economy should be interpreted in accordance with relevant Union law in the areas of the circular economy, waste and chemicals, including Regulations (EC) No 1013/2006 ([19]), (EC) No 1907/2006 ([20]) and (EU) 2019/1021 ([21]) of the European Parliament and of the Council and Directives 94/62/EC ([22]), 2000/53/EC ([23]), 2006/66/EC ([24]), 2008/98/EC ([25]), 2010/75/EU ([26]), 2011/65/EU ([27]), 2012/19/EU ([28]), (EU) 2019/883 ([29]) and (EU) 2019/904 ([30]) of the European Parliament and of the Council, Council

([9]) Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC (OJ L 354, 28.12.2013, p. 22).

([10]) Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327, 22.12.2000, p. 1).

([11]) Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC (OJ L 64, 4.3.2006, p. 37).

([12]) Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration (OJ L 372, 27.12.2006, p. 19).

([13]) Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) (OJ L 164, 25.6.2008, p. 19).

([14]) Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council (OJ L 348, 24.12.2008, p. 84).

([15]) Council Directive 91/271/EEC of 21 May 1991 concerning urban waste water treatment (OJ L 135, 30.5.1991, p. 40).

([16]) Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (OJ L 375, 31.12.1991, p. 1).

([17]) Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption (OJ L 330, 5.12.1998, p. 32).

([18]) Commission Decision (EU) 2017/848 of 17 May 2017 laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardised methods for monitoring and assessment, and repealing Decision 2010/477/EU (OJ L 125, 18.5.2017, p. 43).

([19]) Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste (OJ L 190, 12.7.2006, p. 1).

([20]) Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC (OJ L 396, 30.12.2006, p. 1).

([21]) Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants (OJ L 169, 25.6.2019, p. 45).

([22]) European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste (OJ L 365, 31.12.1994, p. 10).

([23]) Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles (OJ L 269, 21.10.2000, p. 34).

([24]) Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC (OJ L 266, 26.9.2006, p. 1).

([25]) Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008, p. 3).

([26]) Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (OJ L 334, 17.12.2010, p. 17).

([27]) Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (OJ L 174, 1.7.2011, p. 88).

([28]) Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (OJ L 197, 24.7.2012, p. 38).

([29]) Directive (EU) 2019/883 of the European Parliament and of the Council of 17 April 2019 on port reception facilities for the delivery of waste from ships, amending Directive 2010/65/EU and repealing Directive 2000/59/EC (OJ L 151, 7.6.2019, p. 116).

([30]) Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment (OJ L 155, 12.6.2019, p. 1).

Directive 1999/31/EC ([31]), Commission Regulation (EU) No 1357/2014 ([32]) and Commission Decisions 2000/532/EC ([33]) and 2014/955/EU ([34]), and with the communications of the Commission of 2 December 2015 on 'Closing the loop – An EU action plan for the Circular Economy' and of 16 January 2018 on 'A European Strategy for Plastics in a Circular Economy'.

(28) An economic activity can contribute substantially to the environmental objective of transitioning to a circular economy in several ways. It can, for example, increase the durability, reparability, upgradability and reusability of products, or can reduce the use of resources through the design and choice of materials, facilitating repurposing, disassembly and deconstruction in the buildings and construction sector, in particular to reduce the use of building materials and promote the reuse of building materials. It can also contribute substantially to the environmental objective of transitioning to a circular economy by developing 'product-as-a-service' business models and circular value chains, with the aim of keeping products, components and materials at their highest utility and value for as long as possible. Any reduction in the content of hazardous substances in materials and products throughout the life cycle, including by replacing them with safer alternatives, should, as a minimum, be in accordance with Union law. An economic activity can also contribute substantially to the environmental objective of transitioning to a circular economy by reducing food waste in the production, processing, manufacturing or distribution of food.

(29) The environmental objective of pollution prevention and control should be interpreted in accordance with relevant Union law, including Directives 2000/60/EC, 2004/35/EC ([35]), 2004/107/EC ([36]), 2006/118/EC, 2008/50/EC ([37]), 2008/105/EC, 2010/75/EU, (EU) 2016/802 ([38]) and (EU) 2016/2284 ([39]) of the European Parliament and of the Council.

(30) The environmental objective of the protection and restoration of biodiversity and ecosystems should be interpreted in accordance with relevant Union law, including Regulations (EU) No 995/2010 ([40]), (EU) No 511/2014 ([41]) and (EU) No 1143/2014 ([42]) of the European Parliament and of the Council, Directive 2009/147/EC of the European Parliament and of the Council ([43]), Council Regulation (EC) No 338/97 ([44]), Council Directives 91/676/EEC and 92/43/EEC ([45]), and with the communications of the Commission of 21 May 2003 on 'Forest Law Enforcement,

([31]) Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste (OJ L 182, 16.7.1999, p. 1).
([32]) Commission Regulation (EU) No 1357/2014 of 18 December 2014 replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives (OJ L 365, 19.12.2014, p. 89).
([33]) Commission Decision 2000/532/EC of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1 (4) of Council Directive 91/689/EEC on hazardous waste (OJ L 226, 6.9.2000, p. 3).
([34]) Commission Decision 2014/955/EU of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council (OJ L 370, 30.12.2014, p. 44).
([35]) Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage (OJ L 143, 30.4.2004, p. 56).
([36]) Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air (OJ L 23, 26.1.2005, p. 3).
([37]) Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (OJ L 152, 11.6.2008, p. 1).
([38]) Directive (EU) 2016/802 of the European Parliament and of the Council of 11 May 2016 relating to a reduction in the sulphur content of certain liquid fuels (OJ L 132, 21.5.2016, p. 58).
([39]) Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC (OJ L 344, 17.12.2016, p. 1).
([40]) Regulation (EU) No 995/2010 of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market (OJ L 295, 12.11.2010, p. 23).
([41]) Regulation (EU) No 511/2014 of the European Parliament and of the Council of 16 April 2014 on compliance measures for users from the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization in the Union (OJ L 150, 20.5.2014, p. 59).
([42]) Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species (OJ L 317, 4.11.2014, p. 35).
([43]) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7).
([44]) Council Regulation (EC) No 338/97 of 9 December 1996 on the protection of species of wild fauna and flora by regulating trade therein (OJ L 61, 3.3.1997, p. 1).
([45]) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7).

Governance and Trade (FLEGT)', of 3 May 2011 on 'Our life insurance, our natural capital: an EU biodiversity strategy to 2020', of 6 May 2013 on 'Green Infrastructure (GI) – Enhancing Europe's natural Capital', of 26 February 2016 on 'EU Action Plan against Wildlife Trafficking' and of 23 July 2019 on 'Stepping up EU Action to Protect and Restore the World's Forests'.

(31) An economic activity can contribute substantially to the environmental objective of the protection and restoration of biodiversity and ecosystems, in several ways, including by protecting, conserving or restoring biodiversity and ecosystems, and thereby enhancing ecosystem services. Such services are grouped into four categories, namely provisioning services, such as the provisioning of food and water; regulating services, such as the control of climate and disease; supporting services, such as nutrient cycles and oxygen production; and cultural services, such as providing spiritual and recreational benefits.

(32) For the purposes of this Regulation, the term 'sustainable forest management' should be construed by taking into account practices and uses of forests and forest land that contribute to enhancing biodiversity or to halting or preventing the degradation of ecosystems, deforestation and habitat loss, by taking into account the stewardship and use of forests and forest land in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems, as set out in Resolution H1 of the Second Ministerial Conference on the Protection of Forests in Europe of 16–17 June 1993 in Helsinki on General Guidelines for the Sustainable Management of Forests in Europe as well as by taking into account Regulations (EU) No 995/2010 and (EU) 2018/841 ([46]) of the European Parliament and of the Council and Directive (EU) 2018/2001 of the European Parliament and of the Council ([47]) and the communication of the Commission of 20 September 2013 on 'A new EU Forest Strategy: for forests and the forest-based sector'.

(33) For the purposes of this Regulation, the term 'energy efficiency' is used in a broad sense and should be construed by taking into account relevant Union law, including Regulation (EU) 2017/1369 of the European Parliament and of the Council ([48]) and Directives 2012/27/EU ([49]) and (EU) 2018/844 ([50]) of the European Parliament and of the Council, as well as the implementing measures adopted pursuant to Directive 2009/125/EC of the European Parliament and of the Council ([51]).

(34) For each environmental objective, uniform criteria for determining whether economic activities contribute substantially to that objective should be laid down. One element of the uniform criteria should be to avoid significant harm to any of the environmental objectives set out in this Regulation. This is in order to avoid that investments qualify as environmentally sustainable in cases where the economic activities benefitting from those investments cause harm to the environment to an extent that outweighs their contribution to an environmental objective. Such criteria should take into account the life cycle of the products and services provided by that economic activity in addition to the environmental impact of the economic activity itself, including taking into account evidence from existing life-cycle assessments, in particular by considering their production, use and end of life.

([46]) Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU (OJ L 156, 19.6.2018, p. 1).

([47]) Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (OJ L 328, 21.12.2018, p. 82).

([48]) Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU (OJ L 198, 28.7.2017, p. 1).

([49]) Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC(OJ L 315, 14.11.2012, p. 1).

([50]) Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency (OJ L 156, 19.6.2018, p. 75).

([51]) Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (OJ L 285, 31.10.2009, p. 10).

(35) Recalling the joint commitment of the European Parliament, the Council and the Commission to pursuing the principles enshrined in the European Pillar of Social Rights in support of sustainable and inclusive growth, and recognising the relevance of international minimum human and labour rights and standards, compliance with minimum safeguards should be a condition for economic activities to qualify as environmentally sustainable. For that reason, economic activities should only qualify as environmentally sustainable where they are carried out in alignment with the OECD Guidelines for Multinational Enterprises and UN Guiding Principles on Business and Human Rights, including the declaration on Fundamental Principles and Rights at Work of the International Labour Organisation (ILO), the eight fundamental conventions of the ILO and the International Bill of Human Rights. The fundamental conventions of the ILO define human and labour rights that undertakings should respect. Several of those international standards are enshrined the Charter of Fundamental Rights of the European Union, in particular the prohibition of slavery and forced labour and the principle of non-discrimination. Those minimum safeguards are without prejudice to the application of more stringent requirements related to the environment, health, safety and social sustainability set out in Union law, where applicable. When complying with those minimum safeguards, undertakings should adhere to the principle of 'do no significant harm' referred to in Regulation (EU) 2019/2088, and take into account the regulatory technical standards adopted pursuant to that Regulation that further specify that principle.

(36) In order to ensure consistency between this Regulation and Regulation (EU) 2019/2088, this Regulation should amend Regulation (EU) 2019/2088 to mandate the European Supervisory Authorities established by Regulations (EU) No 1093/2010 ([52]), (EU) No 1094/2010 ([53]) and (EU) No 1095/2010 ([54]) of the European Parliament and of the Council (collectively, the 'ESAs') to jointly develop regulatory technical standards to further specify the details of the content and presentation of the information in relation to the principle of 'do no significant harm'. Those regulatory technical standards should be consistent with the content, methodologies, and presentation of the sustainability indicators in relation to adverse impacts as referred to in Regulation (EU) 2019/2088. They should also be consistent with the principles enshrined in the European Pillar of Social Rights, the OECD Guidelines for Multinational Enterprises, the UN Guiding Principles on Business and Human Rights, including the ILO Declaration on Fundamental Principles and Rights at Work, the eight fundamental conventions of the ILO and the International Bill of Human Rights.

(37) Regulation (EU) 2019/2088 should further be amended to mandate the ESAs to develop, through the Joint Committee, draft regulatory technical standards to supplement the rules on transparency of the promotion of environmental characteristics and of environmentally sustainable investments in pre-contractual disclosures and in periodic reports.

(38) Given the specific technical details needed to assess the environmental impact of an economic activity and the fast-changing nature of both science and technology, the criteria for environmentally sustainable economic activities should be adapted regularly to reflect such changes. For the criteria to be up to date, based on scientific evidence and input from experts as well as relevant stakeholders, the conditions for 'substantial contribution' and 'significant harm' should be specified with more granularity for different economic activities and should be updated regularly. For that purpose, granular and calibrated technical screening criteria for the different economic activities should be established by the Commission on the basis of technical input from a multi-stakeholder platform on sustainable finance.

(39) Some economic activities have a negative impact on the environment, and reducing such negative impact can make a substantial contribution to one or more environmental objectives. For those economic activities, it is appropriate to establish technical screening criteria that require a substantial improvement in environmental performance compared with, inter alia, the industry average, but at the same time avoid environmentally harmful lock-in effects,

([52]) Regulation (EU) No 1093/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority (European Banking Authority), amending Decision No 716/2009/EC and repealing Commission Decision 2009/78/EC (OJ L 331, 15.12.2010, p. 12).

([53]) Regulation (EU) No 1094/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority (European Insurance and Occupational Pensions Authority), amending Decision No 716/2009/EC and repealing Commission Decision 2009/79/EC (OJ L 331, 15.12.2010, p. 48).

([54]) Regulation (EU) No 1095/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority (European Securities and Markets Authority), amending Decision No 716/2009/EC and repealing Commission Decision 2009/77/EC (OJ L 331, 15.12.2010, p. 84).

including carbon-intensive lock-in effects, during the economic lifetime of the funded economic activity. Those criteria should also consider the long-term impact of a specific economic activity.

(40) An economic activity should not qualify as environmentally sustainable if it causes more harm to the environment than the benefits it brings. The technical screening criteria should identify the minimum requirements necessary to avoid significant harm to other objectives, including by building on any minimum requirements laid down pursuant to Union law. When establishing and updating the technical screening criteria, the Commission should ensure that those criteria are based on available scientific evidence, are developed by taking into account life-cycle considerations, including existing life-cycle assessments, and are updated regularly. Where scientific evaluation does not allow for a risk to be determined with sufficient certainty, the precautionary principle should apply in accordance with Article 191 TFEU.

(41) In establishing and updating the technical screening criteria for the environmental objective of climate change mitigation, the Commission should take into account and provide incentives for the ongoing and necessary transition towards a climate-neutral economy in accordance with Article 10(2) of this Regulation. In addition to the use of climate-neutral energy and more investments in already low-carbon economic activities and sectors, the transition requires substantial reductions in greenhouse gas emissions in other economic activities and sectors for which there are no technologically and economically feasible low-carbon alternatives. Those transitional economic activities should qualify as contributing substantially to climate change mitigation if their greenhouse gas emissions are substantially lower than the sector or industry average, they do not hamper the development and deployment of low-carbon alternatives and they do not lead to a lock-in of assets incompatible with the objective of climate-neutrality, considering the economic lifetime of those assets. The technical screening criteria for such transitional economic activities should ensure that those transitional activities have a credible path towards climate-neutrality, and should be adjusted accordingly at regular intervals.

(42) An economic activity should qualify as contributing substantially to one or more of the environmental objectives set out in this Regulation where it directly enables other activities to make a substantial contribution to one or more of those objectives. Such enabling activities should not lead to a lock-in of assets that undermine long-term environmental goals, considering the economic lifetime of those assets, and should have a substantial positive environmental impact, on the basis of life-cycle considerations.

(43) When establishing and updating the technical screening criteria the Commission should take into account relevant Union law, including Regulations (EC) No 1221/2009 ([55]) and (EC) 66/2010 ([56]) of the European Parliament and of the Council, as well as Commission Recommendation 2013/179/EU ([57]) and the communication of the Commission of 16 July 2018 on 'Public procurement for a better environment'. To avoid unnecessary inconsistencies with classifications of economic activities that already exist for other purposes, the Commission should also take into account the statistical classifications relating to the environmental goods and services sector, namely the classification of environmental protection activities (CEPA) and the classification of resource management activities (CReMA) of Regulation (EU) No 538/2014 of the European Parliament and of the Council ([58]). When establishing and updating the technical screening criteria, the Commission should take into account existing environmental indicators and reporting frameworks, developed by, amongst others, the Commission and the European Environment Agency, and existing international standards, such as those developed by, amongst others, the OECD.

([55]) Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), repealing Regulation (EC) No 761/2001 and Commission Decisions 2001/681/EC and 2006/193/EC (OJ L 342, 22.12.2009, p. 1).

([56]) Regulation (EC) No 66/2010 of the European Parliament and the Council of 25 November 2009 on the EU Ecolabel (OJ L 27, 30.1.2010, p. 1).

([57]) Commission Recommendation 2013/179/EU of 9 April 2013 on the use of common methods to measure and communicate the life cycle environmental performance of products and organisations (OJ L 124, 4.5.2013, p. 1).

([58]) Regulation (EU) No 538/2014 of the European Parliament and of the Council of 16 April 2014 amending Regulation (EU) No 691/2011 on European environmental economic accounts (OJ L 158, 27.5.2014, p. 113).

(44) When establishing and updating the technical screening criteria, the Commission should also take into account the specificities of the infrastructure sector and should take into account environmental, social and economic externalities within a cost-benefit analysis. In that regard, the Commission should take into account relevant Union law, including Directives 2001/42/EC ([59]), 2011/92/EU ([60]), 2014/23/EU ([61]), 2014/24/EU ([62]) and 2014/25/EU ([63]) of the European Parliament and of the Council, standards and current methodology, as well as the work of international organisations, such as the OECD. In that context, the technical screening criteria should promote appropriate governance frameworks integrating environmental, social and governance factors as referred to in the United Nations-supported Principles for Responsible Investment at all stages of a project's life cycle.

(45) The technical screening criteria should ensure that relevant economic activities within a specific sector can qualify as environmentally sustainable and are treated equally if they contribute equally to one or more of the environmental objectives laid down in this Regulation. The potential capacity to contribute to those environmental objectives can vary across sectors, which should be reflected in those criteria. However, within each sector, those criteria should not unfairly disadvantage certain economic activities over others if the former contribute to the environmental objectives to the same extent as the latter.

(46) When establishing and updating technical screening criteria for environmentally sustainable activities, the Commission should assess whether the establishment of those criteria would give rise to stranded assets or would result in inconsistent incentives, or would have any other adverse impact on financial markets.

(47) To avoid overly burdensome compliance costs on economic operators, the Commission should establish technical screening criteria that provide for sufficient legal clarity, that are practicable and easy to apply, and for which compliance can be verified within reasonable cost-of-compliance boundaries, thereby avoiding unnecessary administrative burden. Technical screening criteria could require carrying out a life-cycle assessment where sufficiently practicable and where necessary.

(48) To ensure that investments are channelled towards economic activities that make the greatest positive impact on the environmental objectives, the Commission should give priority to the establishment of technical screening criteria for the economic activities that potentially contribute most to the environmental objectives.

(49) Appropriate technical screening criteria should be established for the transport sector, including for mobile assets. Those screening criteria should take into account the fact that the transport sector, including international shipping, contributes close to 26 % of total greenhouse gas emissions in the Union. As stated in the Action Plan on Financing Sustainable Growth the transport sector represents about 30 % of the additional annual investment needed for sustainable development in the Union, for example to increase electrification or to support the transition to cleaner modes of transport by promoting modal shift and better traffic management.

(50) When developing the technical screening criteria, it is of particular importance that the Commission carry out appropriate consultations in line with the Better Regulation Agenda. The process for the establishment and update of the technical screening criteria should involve relevant stakeholders and should build on the advice of experts who have proven knowledge and experience in the relevant areas. For that purpose, the Commission should set up a Platform on Sustainable Finance (the 'Platform'). The Platform should be composed of experts representing both the public and private sectors. Public-sector experts should include representatives of the European Environmental

([59]) Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment (OJ L 197, 21.7.2001, p. 30).

([60]) Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (OJ L 26, 28.1.2012, p. 1).

([61]) Directive 2014/23/EU of the European Parliament and of the Council of 26 February 2014 on the award of concession contracts (OJ L 94, 28.3.2014, p. 1).

([62]) Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC (OJ L 94, 28.3.2014, p. 65).

([63]) Directive 2014/25/EU of the European Parliament and of the Council of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC (OJ L 94, 28.3.2014, p. 243).

Agency, the ESAs, the European Investment Bank and the European Union Agency for Fundamental Rights. Private sector experts should include representatives of financial and non-financial market participants and business sectors, representing relevant industries, and persons with accounting and reporting expertise. The Platform should also include experts representing civil society, including experts in the field of environmental, social, labour and governance issues. Financial market participants should be encouraged to inform the Commission if they consider that an economic activity that does not meet the technical screening criteria, or for which such criteria have not yet been established, should qualify as environmentally sustainable, in order to help the Commission in evaluating the appropriateness of complementing or updating the technical screening criteria.

(51) The Platform should be constituted in accordance with the applicable horizontal rules on the creation and operation of Commission expert groups, including with regard to the selection process. The selection process should aim to ensure a high level of expertise, geographical and gender balance, as well as a balanced representation of relevant know-how, taking into account the specific tasks of the Platform. During the selection process, the Commission should perform an assessment in accordance with those horizontal rules to determine whether potential conflicts of interest exist and should take appropriate measures to resolve any such conflicts.

(52) The Platform should advise the Commission on the development, analysis and review of technical screening criteria, including the potential impact of such criteria on the valuation of assets that qualify as environmentally sustainable assets under existing market practices. The Platform should also advise the Commission on whether the technical screening criteria are suitable for use in future Union policy initiatives aimed at facilitating sustainable investment and on the possible role of sustainability accounting and reporting standards in supporting the application of the technical screening criteria. The Platform should advise the Commission on developing further measures to improve data availability and quality, taking into account the objective of avoiding undue administrative burden, on addressing other sustainability objectives, including social objectives, and on the functioning of minimum safeguards and the possible need to supplement them.

(53) The Commission should continue the existing Member State Expert Group on Sustainable Finance and provide it with a formal status. The tasks of that expert group will, inter alia, consist of advising the Commission on the appropriateness of the technical screening criteria and the approach taken by the Platform with regard to developing those criteria. For that purpose, the Commission should keep the Member States informed through regular meetings of the Member State Expert Group on Sustainable Finance.

(54) In order to specify the requirements set out in this Regulation, and in particular to establish and update for different economic activities granular and calibrated technical screening criteria for what constitutes 'substantial contribution' and 'significant harm' to the environmental objectives, the power to adopt acts in accordance with Article 290 TFEU should be delegated to the Commission in respect of the information required to comply with the disclosure obligations pursuant to this Regulation, and in respect of the technical screening criteria. It is of particular importance that the Commission carry out appropriate consultations during its preparatory work, including at expert level, such as through the Platform and the Member State Expert Group on Sustainable Finance, and that those consultations be conducted in accordance with the principles laid down in the Interinstitutional Agreement of 13 April 2016 on Better Law-Making ([64]). In particular, to ensure equal participation in the preparation of delegated acts, the European Parliament and the Council receive all documents at the same time as Member States' experts, and their experts systematically have access to meetings of Commission expert groups dealing with the preparation of delegated acts.

([64]) OJ L 123, 12.5.2016, p. 1.

(55) This Regulation supplements the disclosure requirements laid down in Regulation (EU) 2019/2088. To ensure the orderly and effective monitoring of compliance by financial market participants with this Regulation, Member States should rely on the competent authorities designated in accordance with Regulation (EU) 2019/2088. To enforce compliance, Member States should in addition lay down rules on measures and penalties, which should be effective, proportionate and dissuasive. National competent authorities and the ESAs should exercise the product intervention powers laid down in Regulations (EU) No 600/2014 ([65]), (EU) No 1286/2014 ([66]) and (EU) 2019/1238 ([67]) of the European Parliament and of the Council also with respect to mis-selling practices or misleading disclosures of sustainability-related information, including the information required under this Regulation.

(56) In order to ensure the efficient and sustainable organisation of the work and meeting practices of both the Platform and the Member State Expert Group on Sustainable Finance, and in order to enable broad participation and efficient interaction within the groups, their subgroups, the Commission and stakeholders, the increased use of digital, including virtual, technologies should be considered, where appropriate.

(57) To give sufficient time to the relevant actors to familiarise themselves with the criteria for qualification as environmentally sustainable economic activities set out in this Regulation and to prepare for their application, the obligations set out in this Regulation should become applicable, for each environmental objective, 12 months after the relevant technical screening criteria have been established.

(58) The provision in this Regulation referring to certificate-based tax incentive schemes that exist prior to the entry into force of this Regulation is without prejudice to the respective competences of the Union and the Member States with respect to tax provisions, as set out by the Treaties.

(59) The application of this Regulation should be reviewed regularly in order to assess, inter alia: the progress with regard to the development of technical screening criteria for environmentally sustainable economic activities; the possible need to revise and complement those criteria for determining whether an economic activity qualifies as environmentally sustainable; the effectiveness of the classification system for environmentally sustainable economic activities in channelling private investment into such activities and in particular as regards the flow of capital into private enterprises and other legal entities; and the further development of that classification system, including by expanding its scope beyond environmentally sustainable economic activities, in order to cover activities that significantly harm the environment, as well as other sustainability objectives, including social objectives.

(60) Since the objectives of this Regulation cannot be sufficiently achieved by the Member States, but can rather, by reason of the need to introduce at Union level uniform criteria for environmentally sustainable economic activities, be better achieved at Union level, the Union may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty on European Union. In accordance with the principle of proportionality as set out in that Article, this Regulation does not go beyond what is necessary in order to achieve those objectives,

HAVE ADOPTED THIS REGULATION:

CHAPTER I

SUBJECT MATTER, SCOPE AND DEFINITIONS

Article 1

Subject matter and scope

1. This Regulation establishes the criteria for determining whether an economic activity qualifies as environmentally sustainable for the purposes of establishing the degree to which an investment is environmentally sustainable.

([65]) Regulation (EU) No 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012 (OJ L 173, 12.6.2014, p. 84).

([66]) Regulation (EU) No 1286/2014 of the European Parliament and of the Council of 26 November 2014 on key information documents for packaged retail and insurance-based investment products (PRIIPs) (OJ L 352, 9.12.2014, p. 1).

([67]) Regulation (EU) 2019/1238 of the European Parliament and of the Council of 20 June 2019 on a pan-European Personal Pension Product (PEPP) (OJ L 198, 25.7.2019, p. 1).

2. This Regulation applies to:

(a) measures adopted by Member States or by the Union that set out requirements for financial market participants or issuers in respect of financial products or corporate bonds that are made available as environmentally sustainable;

(b) financial market participants that make available financial products;

(c) undertakings which are subject to the obligation to publish a non-financial statement or a consolidated non-financial statement pursuant to Article 19a or Article 29a of Directive 2013/34/EU of the European Parliament and of the Council ([68]), respectively.

Article 2

Definitions

For the purposes of this Regulation, the following definitions apply:

(1) 'environmentally sustainable investment' means an investment in one or several economic activities that qualify as environmentally sustainable under this Regulation;

(2) 'financial market participant' means a financial market participant as defined in point (1) of Article 2 of Regulation (EU) 2019/2088 and includes a manufacturer of a pension product to which a Member State has decided to apply that Regulation in accordance with Article 16 of that Regulation;

(3) 'financial product' means a financial product as defined in point (12) of Article 2 of Regulation (EU) 2019/2088;

(4) 'issuer' means an issuer as defined in point (h) of Article 2 of Regulation (EU) 2017/1129 of the European Parliament and of the Council ([69]);

(5) 'climate change mitigation' means the process of holding the increase in the global average temperature to well below 2 °C and pursuing efforts to limit it to 1,5 °C above pre-industrial levels, as laid down in the Paris Agreement;

(6) 'climate change adaptation' means the process of adjustment to actual and expected climate change and its impacts;

(7) 'greenhouse gas' means a greenhouse gas listed in Annex I to Regulation (EU) No 525/2013 of the European Parliament and of the Council ([70]);

(8) 'waste hierarchy' means the waste hierarchy as laid down in Article 4 of Directive 2008/98/EC;

(9) 'circular economy' means an economic system whereby the value of products, materials and other resources in the economy is maintained for as long as possible, enhancing their efficient use in production and consumption, thereby reducing the environmental impact of their use, minimising waste and the release of hazardous substances at all stages of their life cycle, including through the application of the waste hierarchy;

(10) 'pollutant' means a substance, vibration, heat, noise, light or other contaminant present in air, water or land which may be harmful to human health or the environment, which may result in damage to material property, or which may impair or interfere with amenities and other legitimate uses of the environment;

(11) 'soil' means the top layer of the Earth's crust situated between the bedrock and the surface, which is composed of mineral particles, organic matter, water, air and living organisms;

([68]) Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC (OJ L 182, 29.6.2013, p. 19).

([69]) Regulation (EU) 2017/1129 of the European Parliament and of the Council of 14 June 2017 on the prospectus to be published when securities are offered to the public or admitted to trading on a regulated market, and repealing Directive 2003/71/EC (OJ L 168, 30.6.2017, p. 12).

([70]) Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC (OJ L 165, 18.6.2013, p. 13).

(12) 'pollution' means:

(a) the direct or indirect introduction of pollutants into air, water or land as a result of human activity;

(b) in the context of the marine environment, pollution as defined in point 8 of Article 3 of Directive 2008/56/EC;

(c) in the context of the water environment, pollution as defined in point 33 of Article 2 of Directive 2000/60/EC;

(13) 'ecosystem' means a dynamic complex of plant, animal, and micro-organism communities and their non-living environment interacting as a functional unit;

(14) 'ecosystem services' means the direct and indirect contributions of ecosystems to the economic, social, cultural and other benefits that people derive from those ecosystems;

(15) 'biodiversity' means the variability among living organisms arising from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and includes diversity within species, between species and of ecosystems;

(16) 'good condition' means, in relation to an ecosystem, that the ecosystem is in good physical, chemical and biological condition or of a good physical, chemical and biological quality with self-reproduction or self-restoration capability, in which species composition, ecosystem structure and ecological functions are not impaired;

(17) 'energy efficiency' means the more efficient use of energy at all the stages of the energy chain from production to final consumption;

(18) 'marine waters' means marine waters as defined in point 1 of Article 3 of Directive 2008/56/EC;

(19) 'surface water' means surface water as defined in point 1 of Article 2 of Directive 2000/60/EC;

(20) 'groundwater' means groundwater as defined in point 2 of Article 2 of Directive 2000/60/EC;

(21) 'good environmental status' means good environmental status as defined in point 5 of Article 3 of Directive 2008/56/EC;

(22) 'good status' means:

(a) for surface water, having both 'good ecological status' as defined in point 22 of Article 2 of Directive 2000/60/EC and 'good surface water chemical status' as defined in point 24 of Article 2 of that Directive;

(b) for groundwater, having both 'good groundwater chemical status' as defined in point 25 of Article 2 of Directive 2000/60/EC and 'good quantitative status' as defined in point 28 of Article 2 of that Directive;

(23) 'good ecological potential' means good ecological potential as defined in point 23 of Article 2 of Directive 2000/60/EC.

CHAPTER II

ENVIRONMENTALLY SUSTAINABLE ECONOMIC ACTIVITIES

Article 3

Criteria for environmentally sustainable economic activities

For the purposes of establishing the degree to which an investment is environmentally sustainable, an economic activity shall qualify as environmentally sustainable where that economic activity:

(a) contributes substantially to one or more of the environmental objectives set out in Article 9 in accordance with Articles 10 to 16;

(b) does not significantly harm any of the environmental objectives set out in Article 9 in accordance with Article 17;

(c) is carried out in compliance with the minimum safeguards laid down in Article 18; and

(d) complies with technical screening criteria that have been established by the Commission in accordance with Article 10 (3), 11(3), 12(2), 13(2), 14(2) or 15(2).

Article 4

Use of the criteria for environmentally sustainable economic activities in public measures, in standards and in labels

Member States and the Union shall apply the criteria set out in Article 3 to determine whether an economic activity qualifies as environmentally sustainable for the purposes of any measure setting out requirements for financial market participants or issuers in respect of financial products or corporate bonds that are made available as environmentally sustainable.

Article 5

Transparency of environmentally sustainable investments in pre-contractual disclosures and in periodic reports

Where a financial product as referred to in Article 9(1), (2) or (3) of Regulation (EU) 2019/2088 invests in an economic activity that contributes to an environmental objective within the meaning of point (17) of Article 2 of that Regulation, the information to be disclosed in accordance with Articles 6(3) and 11(2) of that Regulation shall include the following:

(a) the information on the environmental objective or environmental objectives set out in Article 9 of this Regulation to which the investment underlying the financial product contributes; and

(b) a description of how and to what extent the investments underlying the financial product are in economic activities that qualify as environmentally sustainable under Article 3 of this Regulation.

The description referred to in point (b) of the first subparagraph of this Article shall specify the proportion of investments in environmentally sustainable economic activities selected for the financial product, including details on the proportions of enabling and transitional activities referred to in Article 16 and Article 10(2), respectively, as a percentage of all investments selected for the financial product.

Article 6

Transparency of financial products that promote environmental characteristics in pre-contractual disclosures and in periodic reports

Where a financial product as referred to in Article 8(1) of Regulation (EU) 2019/2088 promotes environmental characteristics, Article 5 of this Regulation shall apply *mutatis mutandis*.

The information to be disclosed in accordance with Articles 6(3) and 11(2) of Regulation (EU) 2019/2088 shall be accompanied by the following statement:

'The "do no significant harm" principle applies only to those investments underlying the financial product that take into account the EU criteria for environmentally sustainable economic activities.

The investments underlying the remaining portion of this financial product do not take into account the EU criteria for environmentally sustainable economic activities.'.

Article 7

Transparency of other financial products in pre-contractual disclosures and in periodic reports

Where a financial product is not subject to Article 8(1) or to Article 9(1), (2) or (3) of Regulation (EU) 2019/2088, the information to be disclosed in accordance with the provisions of sectoral legislation referred to in Articles 6(3) and 11(2) of that Regulation shall be accompanied by the following statement:

'The investments underlying this financial product do not take into account the EU criteria for environmentally sustainable economic activities.'.

Article 8

Transparency of undertakings in non-financial statements

1. Any undertaking which is subject to an obligation to publish non-financial information pursuant to Article 19a or Article 29a of Directive 2013/34/EU shall include in its non-financial statement or consolidated non-financial statement information on how and to what extent the undertaking's activities are associated with economic activities that qualify as environmentally sustainable under Articles 3 and 9 of this Regulation.

2. In particular, non-financial undertakings shall disclose the following:

(a) the proportion of their turnover derived from products or services associated with economic activities that qualify as environmentally sustainable under Articles 3 and 9; and

(b) the proportion of their capital expenditure and the proportion of their operating expenditure related to assets or processes associated with economic activities that qualify as environmentally sustainable under Articles 3 and 9.

3. If an undertaking publishes non-financial information pursuant to Article 19a or Article 29a of Directive 2013/34/EU in a separate report in accordance with Article 19a(4) or Article 29a(4) of that Directive, the information referred to in paragraphs 1 and 2 of this Article shall be published in that separate report.

4. The Commission shall adopt a delegated act in accordance with Article 23 to supplement paragraphs 1 and 2 of this Article to specify the content and presentation of the information to be disclosed pursuant to those paragraphs, including the methodology to be used in order to comply with them, taking into account the specificities of both financial and non-financial undertakings and the technical screening criteria established pursuant to this Regulation. The Commission shall adopt that delegated act by 1 June 2021.

Article 9

Environmental objectives

For the purposes of this Regulation, the following shall be environmental objectives:

(a) climate change mitigation;

(b) climate change adaptation;

(c) the sustainable use and protection of water and marine resources;

(d) the transition to a circular economy;

(e) pollution prevention and control;

(f) the protection and restoration of biodiversity and ecosystems.

Article 10

Substantial contribution to climate change mitigation

1. An economic activity shall qualify as contributing substantially to climate change mitigation where that activity contributes substantially to the stabilisation of greenhouse gas concentrations in the atmosphere at a level which prevents dangerous anthropogenic interference with the climate system consistent with the long-term temperature goal of the Paris Agreement through the avoidance or reduction of greenhouse gas emissions or the increase of greenhouse gas removals, including through process innovations or product innovations, by:

(a) generating, transmitting, storing, distributing or using renewable energy in line with Directive (EU) 2018/2001, including through using innovative technology with a potential for significant future savings or through necessary reinforcement or extension of the grid;

(b) improving energy efficiency, except for power generation activities as referred to in Article 19(3);

(c) increasing clean or climate-neutral mobility;

(d) switching to the use of sustainably sourced renewable materials;

(e) increasing the use of environmentally safe carbon capture and utilisation (CCU) and carbon capture and storage (CCS) technologies that deliver a net reduction in greenhouse gas emissions;

(f) strengthening land carbon sinks, including through avoiding deforestation and forest degradation, restoration of forests, sustainable management and restoration of croplands, grasslands and wetlands, afforestation, and regenerative agriculture;

(g) establishing energy infrastructure required for enabling the decarbonisation of energy systems;

(h) producing clean and efficient fuels from renewable or carbon-neutral sources; or

(i) enabling any of the activities listed in points (a) to (h) of this paragraph in accordance with Article 16.

2. For the purposes of paragraph 1, an economic activity for which there is no technologically and economically feasible low-carbon alternative shall qualify as contributing substantially to climate change mitigation where it supports the transition to a climate-neutral economy consistent with a pathway to limit the temperature increase to 1,5 ^{0}C above pre-industrial levels, including by phasing out greenhouse gas emissions, in particular emissions from solid fossil fuels, and where that activity:

(a) has greenhouse gas emission levels that correspond to the best performance in the sector or industry;

(b) does not hamper the development and deployment of low-carbon alternatives; and

(c) does not lead to a lock-in of carbon-intensive assets, considering the economic lifetime of those assets.

For the purpose of this paragraph and the establishment of technical screening criteria pursuant to Article 19, the Commission shall assess the potential contribution and feasibility of all relevant existing technologies.

3. The Commission shall adopt a delegated act in accordance with Article 23 to:

(a) supplement paragraphs 1 and 2 of this Article by establishing technical screening criteria for determining the conditions under which a specific economic activity qualifies as contributing substantially to climate change mitigation; and

(b) supplement Article 17 by establishing, for each relevant environmental objective, technical screening criteria for determining whether an economic activity in respect of which technical screening criteria have been established pursuant to point (a) of this paragraph causes significant harm to one or more of those objectives.

4. Prior to adopting the delegated act referred to in paragraph 3 of this Article, the Commission shall consult the Platform referred to in Article 20 regarding the technical screening criteria referred to in paragraph 3 of this Article.

5. The Commission shall establish the technical screening criteria referred to in paragraph 3 of this Article in one delegated act, taking into account the requirements of Article 19.

6. The Commission shall adopt the delegated act referred to in paragraph 3 by 31 December 2020, with a view to ensuring its application from 1 January 2022.

Article 11

Substantial contribution to climate change adaptation

1. An economic activity shall qualify as contributing substantially to climate change adaptation where that activity:

(a) includes adaptation solutions that either substantially reduce the risk of the adverse impact of the current climate and the expected future climate on that economic activity or substantially reduce that adverse impact, without increasing the risk of an adverse impact on people, nature or assets; or

(b) provides adaptation solutions that, in addition to satisfying the conditions set out in Article 16, contribute substantially to preventing or reducing the risk of the adverse impact of the current climate and the expected future climate on people, nature or assets, without increasing the risk of an adverse impact on other people, nature or assets.

2. The adaptation solutions referred to in point (a) of paragraph 1 shall be assessed and ranked in order of priority using the best available climate projections and shall, at a minimum, prevent or reduce:

(a) the location-specific and context-specific adverse impact of climate change on the economic activity; or

(b) the potential adverse impact of climate change on the environment within which the economic activity takes place.

3. The Commission shall adopt a delegated act in accordance with Article 23 to:

(a) supplement paragraphs 1 and 2 of this Article by establishing technical screening criteria for determining the conditions under which a specific economic activity qualifies as contributing substantially to climate change adaptation; and

(b) supplement Article 17 by establishing, for each relevant environmental objective, technical screening criteria for determining whether an economic activity in respect of which technical screening criteria have been established pursuant to point (a) of this paragraph causes significant harm to one or more of those objectives.

4. Prior to adopting the delegated act referred to in paragraph 3 of this Article, the Commission shall consult the Platform referred to in Article 20 regarding the technical screening criteria referred to in paragraph 3 of this Article.

5. The Commission shall establish the technical screening criteria referred to in paragraph 3 of this Article in one delegated act, taking into account the requirements of Article 19.

6. The Commission shall adopt the delegated act referred to in paragraph 3 by 31 December 2020, with a view to ensuring its application from 1 January 2022.

Article 12

Substantial contribution to the sustainable use and protection of water and marine resources

1. An economic activity shall qualify as contributing substantially to the sustainable use and protection of water and marine resources where that activity either contributes substantially to achieving the good status of bodies of water, including bodies of surface water and groundwater or to preventing the deterioration of bodies of water that already have good status, or contributes substantially to achieving the good environmental status of marine waters or to preventing the deterioration of marine waters that are already in good environmental status, by:

(a) protecting the environment from the adverse effects of urban and industrial waste water discharges, including from contaminants of emerging concern such as pharmaceuticals and microplastics, for example by ensuring the adequate collection, treatment and discharge of urban and industrial waste waters;

(b) protecting human health from the adverse impact of any contamination of water intended for human consumption by ensuring that it is free from any micro-organisms, parasites and substances that constitute a potential danger to human health as well as increasing people's access to clean drinking water;

(c) improving water management and efficiency, including by protecting and enhancing the status of aquatic ecosystems, by promoting the sustainable use of water through the long-term protection of available water resources, inter alia, through measures such as water reuse, by ensuring the progressive reduction of pollutant emissions into surface water and groundwater, by contributing to mitigating the effects of floods and droughts, or through any other activity that protects or improves the qualitative and quantitative status of water bodies;

(d) ensuring the sustainable use of marine ecosystem services or contributing to the good environmental status of marine waters, including by protecting, preserving or restoring the marine environment and by preventing or reducing inputs in the marine environment; or

(e) enabling any of the activities listed in points (a) to (d) of this paragraph in accordance with Article 16.

2. The Commission shall adopt a delegated act in accordance with Article 23 to:

(a) supplement paragraph 1 of this Article by establishing technical screening criteria for determining the conditions under which a specific economic activity qualifies as contributing substantially to sustainable use and protection of water and marine resources; and

(b) supplement Article 17 by establishing, for each relevant environmental objective, technical screening criteria, for determining whether an economic activity in respect of which technical screening criteria have been established pursuant to point (a) of this paragraph causes significant harm to one or more of those objectives.

3. Prior to adopting the delegated act referred to in paragraph 2 of this Article, the Commission shall consult the Platform referred to in Article 20 regarding the technical screening criteria referred to in paragraph 2 of this Article.

4. The Commission shall establish the technical screening criteria referred to in paragraph 2 of this Article in one delegated act, taking into account the requirements of Article 19.

5. The Commission shall adopt the delegated act referred to in paragraph 2 by 31 December 2021, with a view to ensuring its application from 1 January 2023.

Article 13

Substantial contribution to the transition to a circular economy

1. An economic activity shall qualify as contributing substantially to the transition to a circular economy, including waste prevention, re-use and recycling, where that activity:

(a) uses natural resources, including sustainably sourced bio-based and other raw materials, in production more efficiently, including by:

  (i) reducing the use of primary raw materials or increasing the use of by-products and secondary raw materials; or

  (ii) resource and energy efficiency measures;

(b) increases the durability, reparability, upgradability or reusability of products, in particular in designing and manufacturing activities;

(c) increases the recyclability of products, including the recyclability of individual materials contained in those products, inter alia, by substitution or reduced use of products and materials that are not recyclable, in particular in designing and manufacturing activities;

(d) substantially reduces the content of hazardous substances and substitutes substances of very high concern in materials and products throughout their life cycle, in line with the objectives set out in Union law, including by replacing such substances with safer alternatives and ensuring traceability;

(e) prolongs the use of products, including through reuse, design for longevity, repurposing, disassembly, remanufacturing, upgrades and repair, and sharing products;

(f) increases the use of secondary raw materials and their quality, including by high-quality recycling of waste;

(g) prevents or reduces waste generation, including the generation of waste from the extraction of minerals and waste from the construction and demolition of buildings;

(h) increases preparing for the re-use and recycling of waste;

(i) increases the development of the waste management infrastructure needed for prevention, for preparing for re-use and for recycling, while ensuring that the recovered materials are recycled as high-quality secondary raw material input in production, thereby avoiding downcycling;

(j) minimises the incineration of waste and avoids the disposal of waste, including landfilling, in accordance with the principles of the waste hierarchy;

(k) avoids and reduces litter; or

(l) enables any of the activities listed in points (a) to (k) of this paragraph in accordance with Article 16.

2. The Commission shall adopt a delegated act in accordance with Article 23 to:

(a) supplement paragraph 1 of this Article by establishing technical screening criteria for determining the conditions under which a specific economic activity qualifies as contributing substantially to the transition to a circular economy; and

(b) supplement Article 17 by establishing, for each relevant environmental objective, technical screening criteria for determining whether an economic activity in respect of which technical screening criteria have established pursuant to point (a) of this paragraph causes significant harm to one or more of those objectives.

3. Prior to adopting the delegated act referred to in paragraph 2 of this Article, the Commission shall consult the Platform referred to in Article 20 regarding the technical screening criteria referred to in paragraph 2 of this Article.

4. The Commission shall establish the technical screening criteria referred to in paragraph 2 of this Article in one delegated act, taking into account the requirements of Article 19.

5. The Commission shall adopt the delegated act referred to in paragraph 2 by 31 December 2021, with a view to ensuring its application from 1 January 2023.

Article 14

Substantial contribution to pollution prevention and control

1. An economic activity shall qualify as contributing substantially to pollution prevention and control where that activity contributes substantially to environmental protection from pollution by:

(a) preventing or, where that is not practicable, reducing pollutant emissions into air, water or land, other than greenhouse gasses;

(b) improving levels of air, water or soil quality in the areas in which the economic activity takes place whilst minimising any adverse impact on, human health and the environment or the risk thereof;

(c) preventing or minimising any adverse impact on human health and the environment of the production, use or disposal of chemicals;

(d) cleaning up litter and other pollution; or

(e) enabling any of the activities listed in points (a) to (d) of this paragraph in accordance with Article 16.

2. The Commission shall adopt a delegated act in accordance with Article 23 to:

(a) supplement paragraph 1 of this Article by establishing technical screening criteria for determining the conditions under which a specific economic activity qualifies as contributing substantially to pollution prevention and control; and

(b) supplement Article 17 by establishing, for each relevant environmental objective, technical screening criteria for determining whether an economic activity in respect of which technical screening criteria have been established pursuant to point (a) of this paragraph causes significant harm to one or more of those objectives.

3. Prior to adopting the delegated act referred to in paragraph 2 of this Article, the Commission shall consult the Platform referred to in Article 20 regarding the technical screening criteria referred to in paragraph 2 of this Article.

4. The Commission shall establish the technical screening criteria referred to in paragraph 2 of this Article in one delegated act, taking into account the requirements of Article 19.

5. The Commission shall adopt the delegated act referred to in paragraph 2 by 31 December 2021, with a view to ensuring its application from 1 January 2023.

Article 15

Substantial contribution to the protection and restoration of biodiversity and ecosystems

1. An economic activity shall qualify as contributing substantially to the protection and restoration of biodiversity and ecosystems where that activity contributes substantially to protecting, conserving or restoring biodiversity or to achieving the good condition of ecosystems, or to protecting ecosystems that are already in good condition, through:

(a) nature and biodiversity conservation, including achieving favourable conservation status of natural and semi-natural habitats and species, or preventing their deterioration where they already have favourable conservation status, and protecting and restoring terrestrial, marine and other aquatic ecosystems in order to improve their condition and enhance their capacity to provide ecosystem services;

(b) sustainable land use and management, including adequate protection of soil biodiversity, land degradation neutrality and the remediation of contaminated sites;

(c) sustainable agricultural practices, including those that contribute to enhancing biodiversity or to halting or preventing the degradation of soils and other ecosystems, deforestation and habitat loss;

(d) sustainable forest management, including practices and uses of forests and forest land that contribute to enhancing biodiversity or to halting or preventing degradation of ecosystems, deforestation and habitat loss; or

(e) enabling any of the activities listed in points (a) to (d) of this paragraph in accordance with Article 16.

2. The Commission shall adopt a delegated act in accordance with Article 23 to:

(a) supplement paragraph 1 of this Article by establishing technical screening criteria for determining the conditions under which a specific economic activity qualifies as contributing substantially to the protection and restoration of biodiversity and ecosystems; and

(b) supplement Article 17 by establishing, for each relevant environmental objective, technical screening criteria for determining whether an economic activity in respect of which technical screening criteria have been established pursuant to point (a) of this paragraph causes significant harm to one or more of those objectives.

3. Prior to adopting the delegated act referred to in paragraph 2 of this Article, the Commission shall consult the Platform referred to in Article 20 regarding the technical screening criteria referred to in paragraph 2 of this Article.

4. The Commission shall establish the technical screening criteria referred to in paragraph 2 of this Article in one delegated act, taking into account the requirements of Article 19.

5. The Commission shall adopt the delegated act referred to in paragraph 2 by 31 December 2021, with a view to ensuring its application from 1 January 2023.

Article 16

Enabling activities

An economic activity shall qualify as contributing substantially to one or more of the environmental objectives set out in Article 9 by directly enabling other activities to make a substantial contribution to one or more of those objectives, provided that such economic activity:

(a) does not lead to a lock-in of assets that undermine long-term environmental goals, considering the economic lifetime of those assets; and

(b) has a substantial positive environmental impact, on the basis of life-cycle considerations.

Article 17

Significant harm to environmental objectives

1. For the purposes of point (b) of Article 3, taking into account the life cycle of the products and services provided by an economic activity, including evidence from existing life-cycle assessments, that economic activity shall be considered to significantly harm:

(a) climate change mitigation, where that activity leads to significant greenhouse gas emissions;

(b) climate change adaptation, where that activity leads to an increased adverse impact of the current climate and the expected future climate, on the activity itself or on people, nature or assets;

(c) the sustainable use and protection of water and marine resources, where that activity is detrimental:

(i) to the good status or the good ecological potential of bodies of water, including surface water and groundwater; or

(ii) to the good environmental status of marine waters;

(d) the circular economy, including waste prevention and recycling, where:

(i) that activity leads to significant inefficiencies in the use of materials or in the direct or indirect use of natural resources such as non-renewable energy sources, raw materials, water and land at one or more stages of the life cycle of products, including in terms of durability, reparability, upgradability, reusability or recyclability of products;

(ii) that activity leads to a significant increase in the generation, incineration or disposal of waste, with the exception of the incineration of non-recyclable hazardous waste; or

(iii) the long-term disposal of waste may cause significant and long-term harm to the environment;

(e) pollution prevention and control, where that activity leads to a significant increase in the emissions of pollutants into air, water or land, as compared with the situation before the activity started; or

(f) the protection and restoration of biodiversity and ecosystems, where that activity is:

(i) significantly detrimental to the good condition and resilience of ecosystems; or

(ii) detrimental to the conservation status of habitats and species, including those of Union interest.

2. When assessing an economic activity against the criteria set out in paragraph 1, both the environmental impact of the activity itself and the environmental impact of the products and services provided by that activity throughout their life cycle shall be taken into account, in particular by considering the production, use and end of life of those products and services.

Article 18

Minimum safeguards

1. The minimum safeguards referred to in point (c) of Article 3 shall be procedures implemented by an undertaking that is carrying out an economic activity to ensure the alignment with the OECD Guidelines for Multinational Enterprises and the UN Guiding Principles on Business and Human Rights, including the principles and rights set out in the eight fundamental conventions identified in the Declaration of the International Labour Organisation on Fundamental Principles and Rights at Work and the International Bill of Human Rights.

2. When implementing the procedures referred to in paragraph 1 of this Article, undertakings shall adhere to the principle of 'do no significant harm' referred to in point (17) of Article 2 of Regulation (EU) 2019/2088.

Article 19

Requirements for technical screening criteria

1. The technical screening criteria established pursuant to Articles 10(3), 11(3), 12(2), 13(2), 14(2) and 15(2) shall:

(a) identify the most relevant potential contributions to the given environmental objective while respecting the principle of technological neutrality, considering both the short- and long-term impact of a given economic activity;

(b) specify the minimum requirements that need to be met to avoid significant harm to any of the relevant environmental objectives, considering both the short- and long-term impact of a given economic activity;

(c) be quantitative and contain thresholds to the extent possible, and otherwise be qualitative;

(d) where appropriate, build upon Union labelling and certification schemes, Union methodologies for assessing environmental footprint, and Union statistical classification systems, and take into account any relevant existing Union legislation;

(e) where feasible, use sustainability indicators as referred to in Article 4(6) of Regulation (EU) 2019/2088;

(f) be based on conclusive scientific evidence and the precautionary principle enshrined in Article 191 TFEU;

(g) take into account the life cycle, including evidence from existing life-cycle assessments, by considering both the environmental impact of the economic activity itself and the environmental impact of the products and services provided by that economic activity, in particular by considering the production, use and end of life of those products and services;

(h) take into account the nature and the scale of the economic activity, including:

(i) whether it is an enabling activity as referred to in Article 16; or

(ii) whether it is a transitional activity as referred to in Article 10(2);

(i) take into account the potential market impact of the transition to a more sustainable economy, including the risk of certain assets becoming stranded as a result of such transition, as well as the risk of creating inconsistent incentives for investing sustainably;

(j) cover all relevant economic activities within a specific sector and ensure that those activities are treated equally if they contribute equally towards the environmental objectives set out in Article 9 of this Regulation, to avoid distorting competition in the market; and

(k) be easy to use and be set in a manner that facilitates the verification of their compliance.

Where the economic activity belongs to one of the categories referred to in point (h), the technical screening criteria shall clearly indicate that fact.

2. The technical screening criteria referred to in paragraph 1 shall also include criteria for activities related to the clean energy transition consistent with a pathway to limit the temperature increase to 1,5 ^{0}C above pre-industrial levels, in particular energy efficiency and renewable energy, to the extent that those activities substantially contribute to any of the environmental objectives.

3. The technical screening criteria referred to in paragraph 1 shall ensure that power generation activities that use solid fossil fuels do not qualify as environmentally sustainable economic activities.

4. The technical screening criteria referred to in paragraph 1 shall also include criteria for activities related to the switch to clean or climate-neutral mobility, including through modal shift, efficiency measures and alternative fuels, to the extent that those are substantially contributing to any of the environmental objectives.

5. The Commission shall regularly review the technical screening criteria referred to in paragraph 1 and, where appropriate, amend the delegated acts adopted in accordance with this Regulation in line with scientific and technological developments.

In that context, before amending or replacing a delegated act, the Commission shall assess the implementation of those criteria taking into account the outcome of their application by financial market participants and their impact on capital markets, including on the channelling of investment into environmentally sustainable economic activities.

To ensure that economic activities as referred to in Article 10(2) remain on a credible transition pathway consistent with a climate-neutral economy, the Commission shall review the technical screening criteria for those activities at least every three years and, where appropriate, amend the delegated act referred to in Article 10(3) in line with scientific and technological developments.

Article 20

Platform on Sustainable Finance

1. The Commission shall establish a Platform on Sustainable Finance (the 'Platform'). It shall be composed in a balanced manner of the following groups:

(a) representatives of:

  (i) the European Environment Agency;

  (ii) the ESAs;

  (iii) the European Investment Bank and the European Investment Fund; and

  (iv) the European Union Agency for Fundamental Rights;

(b) experts representing relevant private stakeholders, including financial and non-financial market participants and business sectors, representing relevant industries, and persons with accounting and reporting expertise;

(c) experts representing civil society, including persons with expertise in the field of environmental, social, labour and governance issues;

(d) experts appointed in a personal capacity, who have proven knowledge and experience in the areas covered by this Regulation;

(e) experts representing academia, including universities, research institutes and other scientific organisations, including persons with global expertise.

2. The Platform shall:

(a) advise the Commission on the technical screening criteria referred to in Article 19, as well as on the possible need to update those criteria;

(b) analyse the impact of the technical screening criteria in terms of potential costs and benefits of their application;

(c) assist the Commission in analysing requests from stakeholders to develop or revise technical screening criteria for a given economic activity;

(d) advise the Commission, where appropriate, on the possible role of sustainability accounting and reporting standards in supporting the application of the technical screening criteria;

(e) monitor and regularly report to the Commission on trends at Union and Member State level regarding capital flows into sustainable investment;

(f) advise the Commission on the possible need to develop further measures to improve data availability and quality;

(g) advise the Commission on the usability of the technical screening criteria, taking into account the need to avoid undue administrative burdens;

(h) advise the Commission on the possible need to amend this Regulation;

(i) advise the Commission on the evaluation and development of sustainable finance policies, including with regard to policy coherence issues;

(j) advise the Commission on addressing other sustainability objectives, including social objectives;

(k) advise the Commission on the application of Article 18 and the possible need to supplement the requirements thereof.

3. The Platform shall take into account the views of a wide range of stakeholders.

4. The Platform shall be chaired by the Commission and constituted in accordance with the horizontal rules on the creation and operation of Commission expert groups. In that context the Commission may invite experts with specific expertise on an *ad hoc* basis.

5. The Platform shall carry out its tasks in accordance with the principle of transparency. The Commission shall publish the minutes of the meetings of the Platform and other relevant documents on the Commission website.

6. Where financial market participants consider that an economic activity which does not comply with the technical screening criteria established pursuant to this Regulation, or for which such technical screening criteria have not yet been established, should qualify as environmentally sustainable, they may inform the Platform thereof.

Article 21

Competent authorities

1. Member States shall ensure that the competent authorities referred to in Article 14(1) of Regulation (EU) 2019/2088 monitor the compliance of financial market participants with the requirements laid down in Articles 5, 6 and 7 of this Regulation. Member States shall ensure that their competent authorities have all the necessary supervisory and investigatory powers for the exercise of their functions under this Regulation.

2. For the purposes of this Regulation, the competent authorities shall cooperate with each other and shall provide each other, without undue delay, with such information as is relevant for the purposes of carrying out their duties under this Regulation.

Article 22

Measures and penalties

Member States shall lay down the rules on measures and penalties applicable to infringements of Articles 5, 6 and 7. The measures and penalties provided for shall be effective, proportionate and dissuasive.

Article 23

Exercise of the delegation

1. The power to adopt delegated acts is conferred on the Commission subject to the conditions laid down in this Article.

2. The power to adopt delegated acts referred to in Articles 8(4), 10(3), 11(3), 12(2), 13(2), 14(2) and 15(2) shall be conferred on the Commission for an indeterminate period from 12 July 2020.

3. The delegations of powers referred to in Articles 8(4), 10(3), 11(3), 12(2), 13(2), 14(2) and 15(2) may be revoked at any time by the European Parliament or by the Council. A decision to revoke shall put an end to the delegation of the power specified in that decision. It shall take effect the day following the publication of the decision in the *Official Journal of the European Union* or at a later date specified therein. It shall not affect the validity of any delegated acts already in force.

4. The Commission shall gather all necessary expertise, prior to the adoption and during the development of delegated acts, including through the consultation of the experts of the Member State Expert Group on Sustainable Finance referred to in Article 24. Before adopting a delegated act, the Commission shall act in accordance with the principles and procedures laid down in the Interinstitutional Agreement of 13 April 2016 on Better Law-Making.

5. As soon as it adopts a delegated act, the Commission shall notify it simultaneously to the European Parliament and to the Council.

6. A delegated act adopted pursuant to Article 8(4), 10(3), 11(3), 12(2), 13(2), 14(2) or 15(2) shall enter into force only if no objection has been expressed either by the European Parliament or by the Council within a period of four months of notification of that act to the European Parliament and the Council or if, before the expiry of that period, the European Parliament and the Council have both informed the Commission that they will not object. That period shall be extended by two months at the initiative of the European Parliament or of the Council.

Article 24

Member State Expert Group on Sustainable Finance

1. A Member State Expert Group on Sustainable Finance (the 'Member State Expert Group') shall advise the Commission on the appropriateness of the technical screening criteria and the approach taken by the Platform regarding the development of those criteria in accordance with Article 19.

2. The Commission shall inform the Member States through meetings of the Member State Expert Group to facilitate an exchange of views between the Member States and the Commission on a timely basis, in particular as regards the main output of the Platform, such as new technical screening criteria or material updates thereof, or draft reports.

CHAPTER III

FINAL PROVISIONS

Article 25

Amendments to Regulation (EU) 2019/2088

Regulation (EU) 2019/2088 is amended as follows:

(1) the following Article is inserted:

'*Article 2a*

Principle of do no significant harm

1. The European Supervisory Authorities established by Regulations (EU) No 1093/2010, (EU) No 1094/2010 and (EU) No 1095/2010 of the European Parliament and of the Council (collectively, the 'ESAs') shall, through the Joint Committee, develop draft regulatory technical standards to specify the details of the content and presentation of the information in relation to the principle of 'do no significant harm' referred to in point (17) of Article 2 of this Regulation consistent with the content, methodologies, and presentation in respect of the sustainability indicators in relation to the adverse impacts referred to in paragraphs 6 and 7 of Article 4 of this Regulation.

2. The ESAs shall submit the draft regulatory technical standards referred to in paragraph 1 to the Commission by 30 December 2020.

3. Power is delegated to the Commission to supplement this Regulation by adopting the regulatory technical standards referred to in paragraph 1 of this Article in accordance with Articles 10 to 14 of Regulations (EU) No 1093/2010, (EU) No 1094/2010 and (EU) No 1095/2010.';

(2) Article 8 is amended as follows:

(a) the following paragraph is inserted:

'2a. Where financial market participants make available a financial product as referred to in Article 6 of Regulation (EU) 2020/852 of the European Parliament and of the Council (*), they shall include in the information to be disclosed pursuant to Article 6(1) and (3) of this Regulation the information required under Article 6 of Regulation (EU) 2020/852.

(*) 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 (OJ L 198, 22.6.2020, p. 13).';

(b) in paragraph 3, the first subparagraph is replaced by the following:

'3. The ESAs shall, through the Joint Committee, develop draft regulatory technical standards to specify the details of the content and presentation of the information to be disclosed pursuant to paragraphs 1 and 2 of this Article.';

(c) the following paragraph is added:

'4. The ESAs shall, through the Joint Committee, develop draft regulatory technical standards to specify the details of the content and presentation of the information referred to in paragraph 2a of this Article.

When developing the draft regulatory technical standards referred to in the first subparagraph of this paragraph, the ESAs shall take into account the various types of financial products, their characteristics and the differences between them, as well as the objective that disclosures are to be accurate, fair, clear, not misleading, simple and concise and, where necessary to achieve that objective, shall develop draft amendments to the regulatory technical standards referred to in paragraph 3 of this Article. The draft regulatory technical standards shall take into account the respective dates of application set out in points (a) and (b) of Article 27(2) of Regulation (EU) 2020/852 in respect of the environmental objectives set out in Article 9 of that Regulation.

The ESAs shall submit the draft regulatory technical standards referred to in the first subparagraph to the Commission:

(a) in respect of the environmental objectives referred to in points (a) and (b) of Article 9 of Regulation (EU) 2020/852, by 1 June 2021; and

(b) in respect of the environmental objectives referred to in points (c) to (f) of Article 9 of Regulation (EU) 2020/852, by 1 June 2022.

Power is delegated to the Commission to supplement this Regulation by adopting the regulatory technical standards referred to in the first subparagraph of this paragraph in accordance with Articles 10 to 14 of Regulations (EU) No 1093/2010, (EU) No 1094/2010 and (EU) No 1095/2010.';

(3) Article 9 is amended as follows:

(a) the following paragraph is inserted:

'4a. Financial market participants shall include in the information to be disclosed pursuant to Article 6(1) and (3) of this Regulation the information required under Article 5 of Regulation (EU) 2020/852.';

(b) in paragraph 5, the first subparagraph is replaced by the following:

'5. The ESAs shall, through the Joint Committee, develop draft regulatory technical standards to specify the details of the content and presentation of the information to be disclosed pursuant to paragraphs 1 to 4 of this Article.';

(c) the following paragraph is added:

'6. The ESAs shall, through the Joint Committee, develop draft regulatory technical standards to specify the details of the content and presentation of the information referred to in paragraph 4a of this Article.

When developing the draft regulatory technical standards referred to in the first subparagraph of this paragraph, the ESAs shall take into account the various types of financial products, their objectives as referred to in paragraph 4a of this Article and the differences between them as well as the objective that disclosures are to be accurate, fair, clear, not misleading, simple and concise and, where necessary to achieve that objective, shall develop draft amendments to the regulatory technical standards referred to in paragraph 5 of this Article. The draft regulatory technical standards shall take into account the respective dates of application set out in points (a) and (b) of Article 27(2) of Regulation (EU) 2020/852 in respect of the environmental objectives set out in Article 9 of that Regulation.

The ESAs shall submit the draft regulatory technical standards referred to in the first subparagraph to the Commission:

(a) in respect of the environmental objectives referred to in points (a) and (b) of Article 9 of Regulation (EU) 2020/852, by 1 June 2021; and

(b) in respect of the environmental objectives referred to in points (c) to (f) of Article 9 of Regulation (EU) 2020/852, by 1 June 2022.

Power is delegated to the Commission to supplement this Regulation by adopting the regulatory technical standards referred to in the first subparagraph of this paragraph in accordance with Articles 10 to 14 of Regulations (EU) No 1093/2010, (EU) No 1094/2010 and (EU) No 1095/2010.';

(4) Article 11 is amended as follows:

(a) in paragraph 1, the following points are added:

'(c) for a financial product subject to Article 5 of Regulation (EU) 2020/852, the information required under that Article;

(d) for a financial product subject to Article 6 of Regulation (EU) 2020/852, the information required under that Article.';

(b) in paragraph 4, the first subparagraph is replaced by:

'4. The ESAs shall, through the Joint Committee, develop draft regulatory technical standards to specify the details of the content and presentation of the information referred to in points (a) and (b) of paragraph 1.';

(c) the following paragraph is added:

'5. The ESAs shall, through the Joint Committee, develop draft regulatory technical standards to specify the details of the content and presentation of the information referred to in points (c) and (d) of paragraph 1.

When developing the draft regulatory technical standards referred to in the first subparagraph of this paragraph, the ESAs shall take into account the various types of financial products, their characteristics and objectives and the differences between them and, where necessary, shall develop draft amendments to the regulatory technical standards referred to in paragraph 4 of this Article. The draft regulatory technical standards shall take into account the respective dates of application set out in points (a) and (b) of Article 27(2) of Regulation (EU) 2020/852 in respect of the environmental objectives set out in Article 9 of that Regulation. The ESAs shall update the regulatory technical standards in the light of regulatory and technological developments.

The ESAs shall submit the draft regulatory technical standards referred to in the first subparagraph to the Commission:

(a) in respect of the environmental objectives referred to in points (a) and (b) of Article 9 of Regulation (EU) 2020/852, by 1 June 2021; and

(b) in respect of the environmental objectives referred to in points (c) to (f) of Article 9 of Regulation (EU) 2020/852, by 1 June 2022.

Power is delegated to the Commission to supplement this Regulation by adopting the regulatory technical standards referred to in the first subparagraph of this paragraph in accordance with Articles 10 to 14 of Regulations (EU) No 1093/2010, (EU) No 1094/2010 and (EU) No 1095/2010.';

(5) in Article 20, paragraph 3 is replaced by the following:

'3. By way of derogation from paragraph 2 of this Article:

(a) Articles 4(6) and (7), 8(3), 9(5), 10(2), 11(4) and 13(2) shall apply from 29 December 2019;

(b) Articles 2a, 8(4), 9(6) and 11(5) shall apply from 12 July 2020;

(c) Articles 8(2a) and 9(4a) shall apply:

(i) in respect of the environmental objectives referred to in points (a) and (b) of Article 9 of Regulation (EU) 2020/852, from 1 January 2022; and

(ii) in respect of the environmental objectives referred to in points (c) to (f) of Article 9 of Regulation (EU) 2020/852, from 1 January 2023;

(d) Article 11(1), (2) and (3) shall apply from 1 January 2022.'.

Article 26

Review

1. By 13 July 2022, and subsequently every three years thereafter, the Commission shall publish a report on the application of this Regulation. That report shall evaluate the following:

(a) the progress in implementing this Regulation with regard to the development of technical screening criteria for environmentally sustainable economic activities;

(b) the possible need to revise and complement the criteria set out in Article 3 for an economic activity to qualify as environmentally sustainable;

(c) the use of the definition of environmentally sustainable investment in Union law, and at Member State level, including the provisions required for setting up verification mechanisms of compliance with the criteria set out in this Regulation;

(d) the effectiveness of the application of the technical screening criteria established pursuant to this Regulation in channelling private investments into environmentally sustainable economic activities and in particular as regards capital flows, including equity, into private enterprises and other legal entities, both through financial products covered by this Regulation and other financial products;

(e) the access by financial market participants covered by this Regulation and by investors to reliable, timely and verifiable information and data regarding private enterprises and other legal entities, including investee companies within and outside the scope of this Regulation and, in both cases, as regards equity and debt capital, taking into account the associated administrative burden, as well as the procedures for the verification of the data that are necessary for the determination of the degree of alignment with the technical screening criteria and to ensure compliance with those procedures;

(f) the application of Articles 21 and 22.

2. By 31 December 2021, the Commission shall publish a report describing the provisions that would be required to extend the scope of this Regulation beyond environmentally sustainable economic activities and describing the provisions that would be required to cover:

(a) economic activities that do not have a significant impact on environmental sustainability and economic activities that significantly harm environmental sustainability, as well as a review of the appropriateness of specific disclosure requirements related to transitional and enabling activities; and

(b) other sustainability objectives, such as social objectives.

3. By 13 July 2022, the Commission shall assess the effectiveness of the advisory procedures for the development of the technical screening criteria established under this Regulation.

Article 27

Entry into force and application

1. This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

2. Articles 4, 5, 6 and 7 and Article 8(1), (2) and (3) shall apply:

(a) in respect of the environmental objectives referred to in points (a) and (b) of Article 9 from 1 January 2022; and

(b) in respect of the environmental objectives referred to in points (c) to (f) of Article 9 from 1 January 2023.

3. Article 4 shall not apply to certificate-based tax incentive schemes that exist prior to the entry into force of this Regulation and that set out requirements for financial products that aim to finance sustainable projects.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 18 June 2020.

For the European Parliament	*For the Council*
The President	*The President*
D. M. SASSOLI	N. BRNJAC

APPENDIX C: GENERIC CRITERIA FOR DNSH TO POLLUTION PREVENTION AND CONTROL REGARDING USE AND PRESENCE OF CHEMICALS

The activity does not lead to the manufacture, placing on the market or use of:

(a) substances, whether on their own, in mixtures or in articles, listed in Annexes I or II to Regulation (EU) 2019/1021 of the European Parliament and of the Council[369], except in the case of substances present as an unintentional trace contaminant;

(b) mercury and mercury compounds, their mixtures and mercury-added products as defined in Article 2 of Regulation (EU) 2017/852 of the European Parliament and of the Council[370];

(c) substances, whether on their own, in mixture or in articles, listed in Annexes I or II to Regulation (EC) No 1005/2009 of the European Parliament and of the Council[371];

(d) substances, whether on their own, in mixtures or in an articles, listed in Annex II to Directive 2011/65/EU of the European Parliament and of the Council[372], except where there is full compliance with Article 4(1) of that Directive;

(e) substances, whether on their own, in mixtures or in an article, listed in Annex XVII to Regulation (EC) 1907/2006 of the European Parliament and of the Council[373], except where there is full compliance with the conditions specified in that Annex;

(f) substances, whether on their own, or in mixtures or in an article, in a concentration above 0,1 % weight by weight (w/w), and meeting the criteria laid down in Article 57 of Regulation (EC) 1907/2006 and that were identified in accordance with Article 59(1) of that Regulation for a period of at least eighteen months, except if it is assessed and documented by the operators that no other suitable alternative substances or technologies are available on the market, and that they are used under controlled conditions[374];

In addition, the activity does not lead to the manufacture, presence in the final product or output, or placing on the market, of other substances, whether on their own, or in mixtures or

369 Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants (OJ L 169, 25.6.2019, p. 45).

370 Regulation (EU) 2017/852 of the European Parliament and of the Council of 17 May 2017 on mercury, and repealing Regulation (EC) No 1102/2008 (OJ L 137, 24.5.2017, p. 1).

371 Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer (OJ L 286, 31.10.2009, p. 1).

372 Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. (OJ L 174, 1.7.2011, p. 88).

373 Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC. (OJ L 396, 30.12.2006, p. 1).

374 The Commission will review the exceptions from the prohibition from manufacturing, placing on the market or use of the substances referred to in point (f) once it will have published horizontal principles on essential use of chemicals.

in an article, in a concentration above 0,1% weight by weight (w/w), that meet the criteria of Regulation (EC) No 1272/2008 in one of the hazard classes or hazard categories mentioned in Article 57 of Regulation (EC) 1907/2006, except if it is assessed and documented by the operators that no other suitable alternative substances or technologies are available on the market, and that they are used under controlled conditions[375].

[375] The Commission will review the exceptions from the prohibition from manufacture, presence in the final product or output, or placing on the market of the substances referred to in this paragraph once it will have published horizontal principles on essential use of chemicals.