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Public Law Incentives for Green Bonds Investments

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Abstract

The present thesis commits to examine the role of public law incentives within the European Union (EU) in fostering green bond investments. The EU's regulatory frameworks, including the EU Taxonomy Regulation, the EU Green Bond Standard (EU GBS) and the EU Green Bond Regulation (EU GBR), align with the EU's carbon neutrality target until 2050 and aim at providing transparency and credibility in the Green Bond market. This research showcases how public law incentives such as tax credits, subsidies, and loan guarantees, boost the growth of this market segment, enhance investors' confidence and enable financial mechanism that specifically fund green projects. However, public law incentives have to deal with persistent risks, market fragmentation and the regulatory complexities that accompany the Green Bond market. This multidimensional approach based on data, policy documents, academic papers, and academic literature, evaluates the effectiveness of these incentives, their limitations, and the interplay between public and private mechanisms like public-private partnerships (PPPs) and blended finance and showcases how public law incentives can assist Green Bonds in driving the energy transition and achieving EU sustainability goals. This thesis aims to contribute valuable insights to the discussion on market-driven environmental governance schemes as a source of knowledge for important stakeholders of the energy and environmental sector like investors, issuers, policymakers and researchers supporting their understanding of the Green Bond market.

Key Words: Green Bonds, Public Law Incentives, EU Taxonomy Regulation, Sustainable Finance, EU Green Bond Standard (EU GBS), Energy Transition, Greenwashing Risks, Blended Finance.

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List of Abbreviations

CBI - Climate Bonds Initiative

GCF - Green Climate Fund

DNSH - Do No Significant Harm

ESG - Environmental, Social and Governance goals

ESMA - European Securities and Markets Authority

EU - European Union

EuGB - European Green Bond

EuGBR - European Green Bond Regulation

EGDIP - European Green Deal Investment Plan

EIB - European Investment Bank

EFSI - European Fund for Strategic Investments

EU TR - European Union Taxonomy Regulation

GBP - Green Bond Principles

ICMA- International Capital Markets Association

IPCC - Intergovernmental Panel on Climate Change

MDBs - Multilateral development banks

NECPs- National Energy and Climate Plans

NDCs - Nationally Determined Contributions

PPPs - Public- Private Partnerships

RE - Renewable Energy

RES - Renewable Energy Sources

SDGs - Sustainable Development Goals

SLBP – Sustainability- Linked Bond Principles

SPV - Special Purpose Vehicle

SLLs - Sustainability- linked loans

UCPD - Unfair Commercial Practices Directive

UNFCCC - United Nations Framework Convention on Climate Change

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INTRODUCTION

The accelerating impact of climate change and environmental degradation as a global, highly alarming phenomenon that, beyond its environmental impacts, poses risks to the economy calls for combatting the economic effects of this phenomenon via the transition to sustainable practices across all sectors of society and to low carbon economies. This transition in the financial sector can be achieved by utilizing financial instruments, such as the Green Bond, which are debt instruments, usually supported by public law incentives, that exclusively fund green projects and offer opportunities to allocate capital in lucrative projects while contributing to the fight against climate change. The Green Bond market has seen exponential growth in recent years, supported by EU regulatory frameworks, like the European Green Deal and the EU Taxonomy for Sustainable Activities and public law incentives designed to mobilize private capital for climate-related initiatives. In the same spirit of supporting this crucial market segment and committing to the agenda of achieving climate neutrality by 2050, the EU has provided a wide range of regulatory frameworks, spearheaded by initiatives, like the European Green Bond Standard and NextGenerationEU recovery plan.

This thesis aims to explore the critical role of public law incentives, such as tax credits, subsidies, loan guarantees and regulatory frameworks, in fostering and shaping the development of the Green Bond market within the EU, focusing particularly on their ability to address broader risks of sustainable economic transformation. Such barriers and limitations, posed by regulatory complexity, market fragmentation and risks, like greenwashing, can hinder the effectiveness of these initiatives and shatter investors' confidence in this financial scheme. The thesis also evaluates the role of public law incentives as enablers for Green Bond financial mechanisms and the interplay between public law incentives and private-sector initiatives, as complementary in scaling environmentally beneficial projects.

The thesis has utilized an interdisciplinary approach, encompassing legal, environmental and economic analysis to evaluate the role and effectiveness of public law incentives in promoting EU green bond investments. The structure of the thesis is a separation into three main chapters that address the Green Bond landscape and the interaction and role of public law incentives in this market segment. The first chapter offers a comprehensive juxtaposition of definitions of the main objectives of this thesis, Green Bonds and public law incentives and the related notions of sustainable finance, greenwashing and energy transition, while also outlining the crucial EU regulatory frameworks and principles that frame the Green Bond market, such as the EU Taxonomy, the Green Bond Standard. In the second chapter the historical background of the Green Bond market is presented, briefly tracing its worldwide evolution and examining the influence of public law incentives on its growth. The third and final chapter focuses on the risks and limitations that public law incentives need to surpass in order to meet the expected outcome and effectively manage to assist in mobilizing capital and mitigating risks in the Green Bond market.

CHAPTER A: Defining the concepts

a. Green bonds

The European Commission defines Green Bonds as “...debt instruments where the proceeds are exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible green projects” where green projects are “...projects that promote progress on environmentally sustainable activities”¹. As bonds², they constitute a type of debt issued by both public and private entities to finance themselves with the key distinction that they commit the funds obtained specifically for environmental initiatives³. In particular, they are earmarked for infrastructure development investments, specifically within the sectors of renewable energy, energy efficiency, clean transportation, and sustainable water management, with the main objective being addressing climate change and biodiversity loss.

Green bonds differ from a traditional obligation (a “vanilla bond”) due to their detailed reporting on the allocation of proceeds and the environmental impact as well as the green character of the projects in question⁴. While green bonds fall under the general category of sustainable bonds, not all sustainable bonds are at the same time green bonds. The broad category of sustainable bonds encompasses a wide variety of bonds tailored to meet environmental, social and governance (ESG) goals, including social bonds⁵, sustainability bonds⁶, blue bonds⁷, gender bonds⁸ and others targeting both environmental and social issues⁹. In the EU, Green Bonds are guided by the EU Green Bond Standard, which enforces strict compliance with EU climate targets.

¹ European Commission: Directorate-General for Environment, Eisinger, F., Hogg, D., Cochu, A., Skolina, J. et al., Study on the potential of green bond finance for resource-efficient investments, Publications Office, 2016, <https://data.europa.eu/doi/10.2779/234777>

² “A bond is a debt obligation. Investors who buy corporate bonds are lending money to the company issuing the bond. In return, the company makes a legal commitment to pay interest on the principal and, in most cases, to return the principal when the bond comes due or matures.”, U.S. Securities and Exchange Commission (SEC). What are Bonds? SEC Pub. No. 149.

³ According to ICMA, “Green Bonds are any type of bond instrument where the proceeds or an equivalent amount will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible Green Projects and which are aligned with the four core components of the GBP”, see International Capital Markets Association, (2021). <https://www.icmagroup.org/assets/documents/Sustainable-finance/2022-updates/Green-Bond-Principles-June-2022-060623.pdf> while according to OECD “Green bonds are debt instruments used to finance green projects that deliver environmental benefits. A green bond is differentiated from a regular bond by its commitment to use the funds raised to finance or refinance “green” projects, assets or business activities. Green bonds can be issued by either public or private actors up front to raise capital for projects or for refinancing purposes, freeing up capital and leading to increased lending.” “Green bonds: Country experiences, barriers and options.” OECD/ICMA/CBI/China GFC. http://unepinquiry.org/wpcontent/uploads/2016/09/6_Green_Bonds_Country_Experiences_Barriers_and_Options.pdf.

⁴ Deschryver, Pauline, and Frederic de Mariz. 2020. “What Future for the Green Bond Market? How Can Policymakers, Companies, and Investors Unlock the Potential of the Green Bond Market?” *Journal of Risk and Financial Management* 13, no. 3: 61. <https://doi.org/10.3390/jrfm13030061>

⁵ These bonds raise funds for projects that deliver positive social outcomes, such as affordable housing, healthcare, education and social services.

⁶ The sustainability bonds’ funds finance both Green Bonds and Social Bonds meeting both environmental and social goals.

⁷ They target the conservation and sustainable use of ocean and water resources aiming at marine conservation, sustainable fisheries and reduction of ocean pollution. They can be considered as Green Bonds as long as they align with the four core components of the GBP.

⁸ These bonds promote gender equality and the empowerment of women and girls, mainly through education and leadership programs.

⁹ International Capital Market Association (ICMA). Sustainability Bond Guidelines, June 2021 <https://www.icmagroup.org/assets/documents/Sustainable-finance/2022-updates/Green-Bond-Principles-June-2022-060623.pdf>

Green Bonds have an increasingly upward trajectory as they provide benefits for the investors, creating a rather appealing choice for investing. The diversification of the investor's portfolio can mitigate the market and political risks; the transparency and ease of issuance create a landscape of safety and efficiency; and the good publicity that follows the noble acts of environmentally friendly financial decisions made by a company are only a few of the advantages that the investment in green bonds can grant to the potential investor.

The main types of Green Bonds, all of which are aligned with the Green Bond Principles, as listed by ICMA ¹⁰ are the following:

i. Standard Green Use of Proceeds Bonds

Standard Green Use of Proceeds Bonds are the most common type of Green Bonds and constitute a standardized unsecured debt obligation with full recourse to the issuer ¹¹. The repayment of the bond is not dependent on the success of these projects but rather backed by the issuer's balance sheet, offering a lower risk for investors. This form of Green Bonds allows all companies, regardless of the industry sector, as well as governments and financial institutions, to issue them, as long as they have eligible green projects and does refer exclusively to "clean" companies that focus on the environmental industry.

ii. Green Revenue Bonds

These bonds are "non-recourse-to-the-issuer recourse to the issuer debt obligations aligned with the GBP in which the credit exposure in the bond is to the pledged cash flows of the revenue streams, fees, taxes, etc. and whose use of proceeds goes to related or unrelated Green Project(s)" ¹². In this case, the investor's returns are directly tied to the success of the project that is being financed, leading to higher risk for the investor but a more direct relationship between the investor and the investment.

iii. Green Project Bonds

A Project Bond is a bond "...for a single or multiple Green Project(s) for which the investor has direct exposure to the risk of the project(s) with or without potential recourse to the issuer and that is aligned with the GBP" ¹³ and is repaid from the cash flows that will be generated by the RE infrastructure. These bonds are issued by a special purpose vehicle (SPV) for financing a specific green project and are often used in public-private partnerships (PPPs) to fund significant environmental projects.

iv. Secured Green Bonds

Secured Green Bonds or Green securitized bonds refer to bonds collateralized by one or more environmentally sustainable projects or assets, such as renewable energy facilities, energy-efficient buildings, or clean transportation ¹⁴. This bond category includes covered

¹⁰ Ibid, Appendix I (June 2022), p. 8.

¹¹ Ibid.

¹² Ibid.

¹³ Ibid.

¹⁴ This comprehensive definition of Secured Green Bonds or Green Securitized Bonds draws upon a synthesis of information gathered from the Green Bond Principles by the International Capital Market Association (ICMA). Ibid.

bonds, asset-backed securities (ABS), mortgage-backed securities (MBS)¹⁵ and other structures. The cash flows of the assets are the first source of repayment. These bonds enable pooling of green assets, improving market liquidity and providing investors with diversified exposure to sustainable projects. By securitizing green assets, issuers can attract a broader range of investors while promoting environmentally beneficial initiatives, thus supporting global sustainability and climate goals.

b. Public law incentives

According to the Legal Information Institute of Cornell Law School “*An incentive is a reason or motivation that encourages parties to engage in certain conduct or to take certain actions. In the legal context, incentives are often created through laws, regulations, financial subsidies, or tax provisions. They are used as a tool to encourage desired behaviors and to achieve public policy goals. A government may provide tax credits or subsidies to businesses that invest in renewable energy, in order to incentivize the use of cleaner and more sustainable energy sources[...]*”¹⁶.

Such governmental policies constitute public law incentives, which may include tax exemptions, subsidies or guarantees are designed to support Green Bonds by providing a lower final cost of capital and reducing several financial barriers, which will be further analyzed in the present thesis, making Green Bonds more appealing for potential investors and more competitive in comparison to typical bonds. In this way, a favorable regulatory environment guides potential investors into projects that provide environmental benefits, additional financial support and mitigation of investment risks for the issuer and the investor. Thus, the state reaches its national environmental goals, such as the Paris Agreement's Nationally Determined Contributions (NDCs)¹⁷, green building initiatives, energy security and facilitates green finance growth. Moreover, these incentives are closely tied to EU initiatives, like the European Green Deal Investment Plan, which mobilizes a vast amount of money in sustainable projects, and the EU Taxonomy.

c. Taxonomy

Taxonomy is a classification system that defines “*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 the specific*”¹⁸ or in other words the criteria that an economic activity must meet so as to qualify as "green". Taxonomy ensures a consistent and transparent landscape for

¹⁵ An asset-backed security (ABS) is a financial instrument backed by a pool of underlying assets, typically those generating cash flows from debt obligations such as loans, credit card receivables, or other types of payments. Similarly, mortgage-backed securities (MBS) are bonds supported by mortgages on residential or commercial real estate. These securities are formed by bundling multiple loans with comparable characteristics into a single investment product. Investopedia, Asset-Backed Security (ABS) and Mortgage-Backed Security (MBS), <https://www.investopedia.com>

¹⁶ Legal Information Institute, Cornell Law School. "Incentive." LII / Legal Information Institute. Accessed October 5, 2024. <https://www.law.cornell.edu/wex/incentive>.

¹⁷ The Paris Agreement's Nationally Determined Contributions (NDCs) are climate action plans submitted by countries outlining their commitments to reducing greenhouse gas emissions and adapting to climate change, reflecting each nation's capacity and circumstances. These NDCs are central to the Paris Agreement's goal of limiting global warming to well below 2°C, with countries required to update their contributions every five years to increase ambition and align with long-term climate objectives. Also see United Nations Framework Convention on Climate Change (UNFCCC). "Nationally Determined Contributions (NDCs)." <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs>.

¹⁸ Taxonomy Regulation, Article 1(1).

investors, companies and governments, leading to market stability in the energy sector. The most notorious example is the EU Taxonomy Regulation¹⁹ which constitutes a unified, science-based classification system establishing a “green list” of environmentally sustainable economic activities that are aligned with a net zero trajectory by 2050 and the goal of the transformation to a Paris-conformant²⁰ European economy²¹. This unified system allows non-financial and financial companies to share a common definition of sustainability and align their portfolios with sustainability goals, providing transparency and protection against actions of greenwashing.

The EU TR sets four overriding criteria that an economic activity must meet so as to qualify as “green” and environmentally sustainable: substantial contribution to one or more environmental objectives (like climate change mitigation or adaptation, sustainable use of water resources, or biodiversity protection), do no significant harm (DNSH) to any other environmental objectives, compliance with minimum social safeguards and compliance with technical screening criteria²². Based on the EU Action Plan on Financing Sustainable Growth²³, which was launched in March 2018, it facilitates cross border investments across the EU while aiming to alleviate concerns surrounding “greenwashing”²⁴.

The existence of a commonly accepted classification system and definition of the notion of sustainability via the EU Taxonomy Regulation provides all investors equal investment opportunities, as it shields them from potential differences that could emerge in case each Member State used national classification systems in order to determine their economic activities as environmentally sustainable. Thus, the uniformity of the requirements at a national and EU level guides the labeling of financial products, or in our case, Bonds that are marketed as environmentally sustainable.

¹⁹ European Parliament and Council. 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 (EU Taxonomy Regulation). Official Journal of the European Union, June 18, 2020. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020R0852>.

²⁰ The Paris Agreement, adopted in 2015 under the United Nations Framework Convention on Climate Change (UNFCCC), is a landmark international treaty aiming to limit global warming to well below 2°C above pre-industrial levels, with efforts to cap it at 1.5°C and it provides the overarching framework that guides global climate policies and green finance mechanisms, such as green bonds, by aligning investments with sustainability goals and fostering the transition to a low-carbon economy. See 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. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32016D1841>

²¹ The EU Taxonomy Regulation constitutes, alongside Regulation 2019/2088 on sustainability related disclosures in the financial sector” (known as the Sustainable Finance Disclosure Regulation (SFDR73)) and Regulation 2019/2089 (known as Low Carbon Benchmarks Regulation (LCBR74)), constitute the “regulatory trilogy” directly linked to the EU Action Plan on Sustainable Finance.

²² Also see Christos V. Gortsos & Dimitrios Kyriazis, The Taxonomy Regulation and its Implementation, EBI Working Paper Series, 2023

²³ The EU Action Plan on sustainable energy sets out a set of measures to transition Europe towards a low-carbon future, addressing both energy efficiency and emissions reduction. A key initiative within this framework is the Covenant of Mayors (CoM), established by the European Commission in 2008 following the 2007 EU Climate and Energy Package. Its goal is to unite local and regional authorities committed to implementing sustainable energy policies. In 2015, the Covenant of Mayors for Climate & Energy was formed by merging two initiatives, adding climate change adaptation to its original focus on emission reductions. This initiative now aims to reduce emissions by 40% by 2030, prepare for climate impacts, and ensure access to sustainable, secure, and affordable energy. The CoM has since expanded to 11 Eastern Partnership and Central Asian countries, adapting the Sustainable Energy Action Plans (SEAP) to fit local contexts. European Commission. How to Develop a Sustainable Energy Action Plan (SEAP). By Paolo Bertoldi et al. EUR 29412, 2014. <https://eu-mayors.ec.europa.eu/en/about>.

²⁴ In the context of the EU Taxonomy Regulation “greenwashing” refers to the practice of obtaining an unfair competitive advantage by falsely promoting a financial product as eco-friendly when it does not meet the required environmental criteria.

d. *Greenwashing*

In the context of the Taxonomy 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*”²⁵. The notion of greenwashing refers to the act of making false, exaggerating or misleading claims about a product or service having environmental benefits, such as using vague, exaggerated, or deceptive terms like “eco-friendly” or “safe for the environment” in order to win over the consumers or investors who are concerned about environmental issues through deceptive marketing tactics²⁶.

Greenwashing practices are regulated by several legal frameworks that target consumer protection and advertising. The Unfair Commercial Practices Directive (UCPD)²⁷, the European Ecolabel²⁸ initiative, organizations such as European Environment Agency²⁹ and the European Consumer Organization (BEUC)³⁰ are some of the measures that the EU has taken in order to tackle the issue of greenwashing. Finally, the Directive on Corporate Sustainability Due Diligence³¹ fosters sustainable and responsible corporate behavior in companies’ operations and combats greenwashing practices.

In the context of Green Bonds, greenwashing practices exist when the issuer markets the Bonds as Green and environmentally sustainable while the underlying project does not meet or completely meet strict environmental standards. The Taxonomy Regulation and ICMA’s Green Bond Principles, external verification and third-party assurance mechanisms are often employed to assess the legitimacy of green projects and mitigate greenwashing risks and tackle greenwashing practices by providing guidelines and unified definitions on what constitutes a Green Bond, thus reducing the risk of misleading investors and ensuring the integrity of the Green Bond notion. The European Green Bond Standard (EU GBS) and the EU Green Bond Regulation are expected to further curb “greenwashing” through mandatory reporting and alignment with the EU Taxonomy, strengthening investor trust.

²⁵ Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment and amending Regulation (EU) 2019/2088. Official Journal of the European Union, L 198, 22 June 2020, pp. 13–43 (paragraph 11). Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R0852>.

²⁶ Quinson, T., “What’s the Legal Definition of Greenwashing?”, (2023). Retrieved from <https://future-bridge.eu/the-legal-risks-of-greenwashing-and-how-to-avoid-them/>

²⁷ European Parliament and Council. Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 Concerning Unfair Business-to-Consumer Commercial Practices in the Internal Market. Official Journal of the European Union, May 11, 2005. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32005L0029>. The Directive aims to combat misleading commercial practices and ensure that consumers are provided with accurate information about products and services.

²⁸ It is a voluntary certification scheme that allows companies to prove that their products are environmentally friendly and consequently a product must meet strict environmental criteria and pass a comprehensive assessment process. For more information see https://environment.ec.europa.eu/topics/circular-economy/eu-ecolabel_en

²⁹ EEA is an EU organization tasked with providing independent information on the environment, helping to support sustainable development, and contributing to significant improvements in Europe’s environmental policies through data collection, analysis, and dissemination. For more information see <https://www.eea.europa.eu/en>

³⁰ BEUC as an umbrella group represents and defends the interests of European consumers in policy-making processes at the EU level, advocating for consumer protection, rights, and safety across various sectors. For more information see <https://www.beuc.eu>.

³¹ European Parliament and Council. Directive (EU) 2024/1760 of the European Parliament and of the Council of 27 September 2024 on corporate sustainability due diligence and amending Directive (EU) 2019/1937 and Regulation (EU) 2023/2859 (Text with EEA relevance). Official Journal of the European Union, September 27, 2024. <https://eur-lex.europa.eu/eli/dir/2024/1760/oj>.

e. Energy Transition

The notion of energy transition refers to the societal transition in the direction of moving away the energy systems from fossil fuels, like oil, coal and natural gas, which are carbon-intensive energy sources, in favor of clean, sustainable, affordable, low-carbon, renewable energy. Such initiatives encompass energy sources of solar, hydro, wind and geothermal power³² as well as reliable energy relevant technologies that support this transition, including energy storage, supply management tools, grid infrastructure and electric devices³³. The main goals of energy transition are the decarbonization of the energy sector aiming at mitigating climate change by reducing GHG emissions and promoting energy security and the minimization of the environmental impacts of energy generation and consumption.

Energy transition has another aspect, that of socio-economic shift, with regulations and governmental initiatives on reducing reliance on traditional energy sources and encouraging energy efficacy and energy justice, thus supporting the energy transition itself, climate targets (such as those outlined in the Paris Agreement³⁴) and economic growth. On that note, funding projects related to renewable energy sources and generally sustainable initiatives aids the progress of energy transition. Green Bonds, as a financial instrument for funding such projects, accelerate the energy transition via raising capital for clean energy projects for large-scale, energy-efficient infrastructures.

f. Sustainable Finance

Regarding the notion of “sustainable finance” various definitions have been provided. According to the Commission Communication of 8 March 2018 on an “Action Plan on Financing Sustainable Growth”, “*Sustainable finance* generally refers to the process of taking due account of environmental and social considerations in investment decision-making, leading to increased investments in longer-term and sustainable activities”³⁵. The linkage between financing activities and ESG considerations³⁶ is clear in the definition and constitutes a response to dramatic climate change and environmental degradation³⁷. Moreover, sustainable finance ensures transparency when it comes to

³² For more information, please see Climate Bonds Initiative. Energy Transition Finance. Climate Bonds Initiative, 2020. <https://www.climatebonds.net/transition-finance/energy>.

³³ For more information, please see International Renewable Energy Agency (IRENA). “World Energy Transitions Outlook, 1.5° Pathway” Abu Dhabi: IRENA, 2021. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/Jun/IRENA_World_Energy_Transitions_Outlook_2021.pdf

³⁴ United Nations Framework Convention on Climate Change (UNFCCC). Paris Agreement. Paris: UNFCCC, 2015

³⁵ European Commission. Communication from the Commission to the European Parliament, the European Council, the Council, the European Central Bank, the European Economic and Social Committee, and the Committee of the Regions: Action Plan—Financing Sustainable Growth. Brussels: European Commission, 2018, p.2. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0097>.

³⁶ ESG considerations refer to the assessment of environmental, social, and governance factors in decision-making. Environmental factors look at a company’s impact on the planet, social factors examine relationships with employees and communities, and governance focuses on leadership and transparency. These considerations are used to evaluate the long-term sustainability and ethical practices of companies.

³⁷ According to the European Commission sustainable finance refers to the process of taking environmental, social and governance (ESG) considerations into account when making investment decisions in the financial sector, leading to more long-term investments in sustainable economic activities and projects. Read more on https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/overview-sustainable-finance_en

Another worth mentioning definition is that of G20 Sustainable Finance Study Group (2018) (p.4) where sustainable financing can be defined “as financing as well as related institutional and market arrangements that contribute to the achievement of strong, sustainable, balanced and inclusive growth, through supporting directly and indirectly the framework of the Sustainable Development Goals (SDGs)”

risks related to ESG factors, financial returns and achieving sustainability goals ³⁸. Financial instruments, such as Green Bonds, that are designed to finance projects aligned with ESG principles, are part of sustainable finance, as they are specifically used for projects with environmental benefits and energy transition directives.

CHAPTER B: Overview of the green bond market

The green bond market has rapidly evolved into a crucial tool for financing renewable energy projects worldwide. Since its inception in 2007, green bonds have served as a means to raise funds for environmentally sustainable initiatives, facilitating investments in renewable energy, energy efficiency, and other climate-focused endeavors. This market's growth reflects a global shift towards financing solutions aligned with climate and sustainability goals.

A. Historical Context of Green Bonds in the Global and Local Markets.

The year 2007 marked the beginning of the history of Green Bonds, when the European Investment Bank (EIB) issued the first official Green Bond, under the label "Climate Awareness Bond" responding to the growing recognition of climate change and the shift towards sustainable financing ³⁹, which was partially influenced by the Intergovernmental Panel on Climate Change (IPCC) report on global warming. That same year, Swedish pension funds seeking to invest in green projects sought assistance from the World Bank to guide them as they lacked guidelines to identify environmentally sustainable projects.

That first Green Bond ignited the start of new financial tools that support green, sustainable projects. In 2008, the World Bank, following the lead, issued its own first Green Bond showcasing the wider adoption of this financial instrument and creating a blueprint for sustainable investing in the capital markets ⁴⁰, encouraging investors to invest in GHG emission reduction and renewable energy development projects. After that, the Green Bond market expanded, and for the next decade, the issuance of Green Bonds was worth millions, if not billions of dollars annually, while by 2014, corporations ⁴¹ and governments issued their own Green Bonds, creating a wide diversification of the profile of issuers and projects.

The regulatory landscape for Green Bonds quickly developed, aiming at maintaining order and overseeing this new market dynamic. The Green Bond Principles (2014) by the International Capital Market Association (ICMA) standardized the framework specifying

³⁸ Also see Maragopoulos N. (2021): Towards a European Green Bond: A Commission's proposal to promote sustainable finance, September 2021. European Banking Institute Working Paper 65, Series 2021 - no. 103 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3933766

³⁹ The history of green bonds, however, traces back to San Francisco, which approved a "solar bond" in 2001 to finance renewable energy projects. See Local Power. History of Solar & H Bonds. Local Power, 2023. <https://localpower.com/HBondsEntire.html>.

⁴⁰ World Bank. From Evolution to Revolution: 10 Years of Green Bonds. Washington, DC: World Bank, 2018. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/517251543844466290/from-evolution-to-revolution-10-years-of-green-bonds>

⁴¹ In 2016, Apple issued its first green bond, raising \$1.5 billion to fund energy-efficient infrastructure, renewable energy projects, and resource conservation efforts within the company. See Apple Inc. "Apple's \$1.5 Billion Green Bond". Apple, 2016. <https://www.apple.com/newsroom/2016/06/apples-1-5-billion-green-bond/>. Similarly, Toyota issued its first green bond in 2014, raising \$1.75 billion to support the development and production of electric and hybrid vehicles, advancing its goal of reducing emissions from the transportation sector. See Toyota Financial Services. "Toyota's First Green Bond". Toyota, 2014. <https://www.toyotafinancial.com>.

the proceeds, while the Climate Bonds Standard by the Climate Bonds Initiative (CBI) provided certification guidelines to ensure the Green Bonds' alignment with climate change mitigation⁴². An intensive challenge of the green bond market was greenwashing tactics with labeling as "green" projects that did not meet the environmental standards, which pushed the EU in forming two regulations – the EU Green Bond Standard (2020) and the EU Taxonomy for Sustainable Activities- which set out criteria and classified the qualifications of Green Bonds⁴³. These efforts aimed at a high level of transparency in the green bond market, safeguarding the credibility of Green Bonds and maintaining investors' trust in the market.

In an overview of local markets, several countries developed their own frameworks supporting Green Bond issuance. Some notable examples of local markets are those of Poland, which issued the first sovereign Green Bond in the world in 2016, followed by France⁴⁴ and Germany, which in 2017 also issued some of the largest sovereign Green Bonds in order to finance large scale renewable energy and climate change mitigation projects. In the United States, which is today's largest Green Bond issuer on a global scale, examples such as California⁴⁵ are game changers issuing state- level Green Bonds to fund water management and energy efficiency projects. Such local frameworks create tailor-made Green Bonds that address regional necessities while at the same time ensuring achieving global sustainability goals.

The green bond market in India's Green Bond market was initiated in 2015 with Yes Bank's issuance of the first Green Bond of the country that raised 5 billion INR⁴⁶ for infrastructures in the renewable energy sector. Following that, India's government entered the market, issuing sovereign Green Bonds to finance public sector projects on reducing GHG emissions⁴⁷. On that note, the general private sector's participation is still limited due to regulatory difficulties and high transaction costs with only two main private players of the country being the Greenko Group and Indore Municipal Corporation⁴⁸. Another worth mentioning first is Malaysia's first Islamic Green Bond in 2017, "Green Sukuk" financing its climate-resilient growth. China, as the leader of the Asian market,

⁴² Further analysis of these frameworks is provided on 3.2(iv) section of the present thesis.

⁴³ Ibid. 3.2 (v and vii)

⁴⁴ A worth mentioning project is that Société des Grands Projets recently issued a €1 billion green bond under a new framework aligned with the EU Taxonomy's climate objectives. This issuance supports projects that meet stringent EU criteria for environmental sustainability, further advancing Europe's green finance landscape. See <https://gsh.cib.natixis.com/our-center-of-expertise/articles/societe-des-grands-projets-issues-1-billion-with-its-new-green-framework-aligned-with-eu-taxonomy-climate-objectives>

⁴⁵ The World Bank in April 2024 issued a 5-year, \$150 million green bond, with proceeds allocated to projects fostering low-carbon and climate-resilient growth in developing countries. As a longstanding partner, the State of California invested solely in this bond, aligning with its climate goals while furthering the World Bank's support for sustainable and inclusive economies worldwide. See World Bank. "State of California Invests in World Bank 5-Year Green Bond." Press Release, April 9, 2024. Accessed October 29, 2024. <https://www.worldbank.org/en/news/press-release/2024/04/09/state-of-california-invests-in-world-bank-5-year-green-bond>.

⁴⁶ INR 5 billion refers to 5 billion Indian Rupees. Converting this to Euros (using a rough exchange rate of 1 INR ≈ 0.011 EUR), it amounts to approximately 55 million Euros.

⁴⁷ For more information please see: Anjanappa, Janardhana, Role of Private Sector in Driving the Green Bond Market in India (September 17, 2024). Available at SSRN: <https://ssrn.com/abstract=4959091> or <http://dx.doi.org/10.2139/ssrn.4959091>

⁴⁸ Indore Municipal Corporation issued Green Bonds worth \$87 million USD in 2023, contributing significantly to the Green Bond market in India. The private sector, including entities like Greenko Group, accounted for a large share—84%—of the total Green Bond issuance in India as of early 2023. Greenko has been a leading issuer, demonstrating substantial private sector involvement in India's renewable energy financing initiatives. Although the two private players account for a significant share of Green Bond issuance, this figure primarily reflects a handful of large issuers rather than widespread private sector participation. The broader private sector engagement in India's green bond market is still limited, with most smaller companies not actively involved due to high issuance costs, regulatory complexity, and limited awareness of green finance.

established in 2015 the China Green Bond Endorsed Project Catalogue, setting clear guidelines for what qualifies as a “green project” and can be the object of a Green Bond with its national landscape, following the in 2021 the removal of “clean coal” projects from the list ⁴⁹.

The global issuance of Green Bonds is set to reach \$0.95 trillion-\$1.05 trillion in 2024, from \$0.98 trillion in 2023 ⁵⁰, showcasing the rushing growth of the Green Bond market. As more and more countries aim at aligning their national financial strategies with Paris Agreement goals and climate goals in general, the market is spreading with expansion of the scope, with new trends such as Transition Bonds ⁵¹ and Sustainability-linked Bonds ⁵², in order to aid high-emission industries to shift towards greener practices.

B. Public Law Incentives on enhancing or hindering the growth of green bond investments.

Public law incentives and governmental incentives play a crucial role in the route that the development of Green Bond investments will follow. Governments provide the investors with relief measures, such as tax benefits or even tax exemptions, subsidies, capital grants, loan guarantees and risk mitigation programs, regulations and policies in order to push investors towards this green financial option.

Tax incentives are a common tactic and can be provided to the investor or the issuer, leading to three main forms, the tax credit bonds ⁵³, the direct subsidy bonds ⁵⁴ and the tax-exempt bonds ⁵⁵. In the United States, interest earned on certain Green Municipal Bonds ⁵⁶ is tax-exempt, lowering the cost of capital for renewable energy projects and making green bonds more attractive to investors. In the same way, other countries provide tax credits or deductions for incentivizing Green Bonds. While tax incentives are in general beneficial for the investors, they need to be monitored and just as they could lead to market distortion if they are selective and provided only with specific types of Green Bonds.

While these incentives play a crucial role in enhancing Green Bond investments, they are subject to constraints under the EU state aid regime, which ensures fair competition

⁴⁹ For more information, on local markets please see: Climate Bonds Initiative, IFC, and Sustainable Banking Network. *Creating Green Bond Markets: Insights, Innovations, and Tools from Emerging Markets*. Report. 2018. Accessed October 29, 2024. https://www.climatebonds.net/files/reports/sbn-ifc-cbi_creating-green-bond-markets_report-2018-.pdf.

⁵⁰ “Global Green Bond Issuance Forecast 2024.” Climate Bonds Initiative, 2023. <https://www.climatebonds.net>.

⁵¹ A transition bond is issued to fund projects that help high-emission companies or industries shift toward more sustainable practices and lower carbon footprints, bridging the gap between current operations and greener, long-term goals. Stanford Sustainable Finance Initiative. *Transition Bond Frameworks: Goals, Issues, and Guiding Principles*. For more information please see https://sfi.stanford.edu/sites/sfi/files/media/file/transition_bond_frameworks-goals_issues_and_guiding_principles_0_0_0_0.pdf.

⁵² A sustainability-linked bond is a type of bond where the financial terms, such as interest rates, are tied to the issuer's achievement of specific environmental, social, or governance (ESG) targets, incentivizing progress toward sustainability goals. For more information, please see International Capital Market Association. “Sustainability-Linked Bond Principles.” <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-linked-bond-principles-slbp>.

⁵³ In tax credit bonds “bond investors receive tax credits instead of interest payments, so issuers do not have to pay interest on their green bond issuances” Climate Bonds Initiative. “Tax Incentives for Issuers and Investors.” Accessed October 30, 2024. <https://www.climatebonds.net/policy/policy-areas/tax-incentives>.

⁵⁴ “bond issuers receive cash rebates from the government to subsidize their net interest payments”. Ibid.

⁵⁵ “bond investors do not have to pay income tax on interest from the green bonds they hold (so issuer can get lower interest rate)”. Ibid.

⁵⁶ U.S. Environmental Protection Agency. “Municipal Bonds and Green Bonds.” Last updated on April 2024. <https://www.epa.gov/statelocalenergy/municipal-bonds-and-green-bonds>.

among member states, and the Foreign Subsidies Regulation, which addresses the influence of non-EU subsidies on the internal market. These legal frameworks restrict the type and extent of incentives that can be provided, potentially hindering their effectiveness.

Moreover, subsidies and capital grants, as direct financial support, are offered especially for renewable energy projects and sustainable infrastructures. For instance, the EU offers such subsidies for projects aligning with the objectives of the EU Green Deal to lower the cost of the investment for the issuer and make the Green Bonds more accessible, thus increasing the financial appeal of such projects. In contrast to these financial incentives, administrative costs and high certification costs prove that meeting green bond standards, while adding to the credibility of the mechanism, will exclude smaller investors from the Green Bond market.

As Green Bonds are a largely unregulated field with no specific definitions or requirements list in many jurisdictions, with the exceptions of China (Green Bond Endorsed Project Catalogue)⁵⁷ and India⁵⁸, private bodies related to the market have developed guidelines, standards and impact reporting mechanisms to fill this gap, with the most notorious ICMA's Green Bond Principles⁵⁹, in addition to the applicable general rules and principles of contract law and securities regulation. Also, the EU, via the EU Green Bond Standard (GBS), sets a regulatory framework that includes criteria for green bond issuance, ensuring that proceeds are allocated to projects aligned with the EU's climate goals and complex compliance requirements, including alignment with the EU Taxonomy, while also a series of other regulations, which will be mentioned further, provide such guidelines and standards. Such regulations, with clear guidelines and enhanced accountability, increase transparency and investor confidence by reducing greenwashing risks and ensuring funds go to genuine renewable energy projects.

On the other hand, the global landscape of green bond investments is significantly influenced by public law incentives but is also characterized by regulatory uncertainty and complexity, which may undermine the incentives' effectiveness and lead to hindering Green Bond market development, as without long-term guidelines, the potential issuer will hesitate to enter a non-secure investing environment with unpredictable policies that might be altered or introduced at any point, particularly for the renewable energy projects that require large upfront investment. A worth mentioning example is the EU Emissions Trading System (EU ETS)⁶⁰ in its early stages, which were characterized by regulatory uncertainty, such as fluctuating carbon prices and inconsistent allocation of allowances across Member States, discouraging long-term green investments, including green bonds, as investors were unable to accurately forecast returns or align projects with the system's evolving criteria⁶¹. Thus, feed-in tariffs and grants to the anticipated revenue

⁵⁷ People's Bank of China. Green Bond Endorsed Project Catalogue (2021 Edition). China Green Bond Standard Committee, 2021. For a quick analysis please see <https://www.icmagroup.org/assets/Analysis-of-Chinas-Green-Bond-Principles.pdf>.

⁵⁸ Department of Economic Affairs, Ministry of Finance, Government of India. Framework for Sovereign Green Bonds. Government of India, 2022.

⁵⁹ International Capital Market Association. Green Bond Principles. 2021. Accessed October 30, 2024. <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp>.

⁶⁰ European Parliament and Council. Directive 2003/87/EC Establishing a Scheme for Greenhouse Gas Emission Allowance Trading within the Community and Amending Council Directive 96/61/EC. Official Journal of the European Union, L 275, 25 October 2003, 32–46. <https://eur-lex.europa.eu/eli/dir/2003/87/oj>

⁶¹ Ellerman, A. D., & Buchner, B. K. "Over-Allocation or Abatement? A Preliminary Analysis of the EU ETS Based on the 2005–06 Emissions Data." *Environmental and Resource Economics*, 2008.

from carbon pricing that were appointed by certain EU Member States, linked renewable energy support schemes and projects, were proven inefficient.

C. The EU Legal Framework on Green Bonds Investments

The supranational legislative framework governing green bond investments plays a pivotal role in shaping a sustainable financial landscape. The European Union (EU) provide comprehensive guidelines, standards, and regulations to enhance market transparency, promote accountability, and mitigate risks such as greenwashing. By establishing stringent criteria for eligible projects and requiring robust reporting and external verification, supranational legislation ensures that green bonds contribute meaningfully to global climate and environmental goals. Before delving into the EU regulatory framework, it is essential to reference the Paris Agreement and the Sustainable Development Goals (SDGs) as they provide the foundational global commitments that guide and align the EU's framework.

i. Paris Agreement and UNFCCC

Under the United Nations Framework Convention on Climate Change (UNFCCC)⁶², the Paris Agreement⁶³ was adopted in 2015, a treaty signed by 196 countries binding for the signatory nations that entered into force in November of 2016, as a result of realizing the high need for mitigating climate change. The goal that was pictured in the Paris Agreement was to restrict global temperature rise -or, most commonly used, global warming- to at least below 2 °C above pre-industrial levels, while striving to limit the escalation to 1.5 °C. Under the Paris Agreement, nationally determined contributions (NDCs)⁶⁴ were introduced, according to which each country has the freedom to set its own GHG reduction targets with the obligation to regularly update the progress and national commitments towards climate change mitigation were set. Such commitments would, naturally, require significant funding that found its path through green finance, including Green Bonds.

The Article 2 (1) point (c)⁶⁵ of the Paris Agreement mentions that “*Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development*” showcasing the key role of finance in the achievement of the climate neutrality goal. The Paris Agreement, also, under Article 9, highlights that “*Developed country Parties shall provide financial resources to assist developing country Parties with respect to both mitigation and adaptation in continuation of their existing obligations under the Convention*”⁶⁶, while “*as part of a global effort, developed country Parties should continue to take the lead in mobilizing climate finance from a wide variety of sources, instruments and channels, noting the significant role of public funds, through a*

⁶² United Nations. United Nations Framework Convention on Climate Change: Text of the Convention. Adopted at the United Nations Conference on Environment and Development, Rio de Janeiro, Brazil, May 9, 1992. Entered into force March 21, 1994. United Nations, 1992.

⁶³ United Nations Framework Convention on Climate Change. Paris Agreement: An Agreement within the Framework of the United Nations Framework Convention on Climate Change. Adopted at the 21st Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21), Paris, December 12, 2015. Entered into force November 4, 2016. https://unfccc.int/sites/default/files/english_paris_agreement.pdf

⁶⁴ Countries are obligated to submit and update Nationally Determined Contributions (NDCs) every five years, setting their greenhouse gas (GHG) reduction targets.

⁶⁵ Paris Agreement, Article 2 (1) point (c) p. 3.

⁶⁶ Paris Agreement, Article 9 par. 1.

*variety of actions, including supporting country-driven strategies, and taking into account the needs and priorities of developing country Parties. Such mobilization of climate finance should represent a progression beyond previous efforts*⁶⁷. Thus, we can conclude that the Paris Agreement indirectly boosts the demand for green bonds as a means for nations and corporations to finance their climate commitments. The Agreement's provisions emphasize transparency and accountability, which aligns well with the green bond principles that require issuers to report on the environmental impact of the funded projects. Worth mentioning, also, is the initiative of the Green Climate Fund (GCF)⁶⁸, under the UNFCCC, the world's largest climate fund, which supports financially countries to meet their NDC targets, showcasing the need for sustainable financing opportunities.

ii. Sustainable Development Goals (SDGs)

The Sustainable Development Goals (SDGs) were adopted by the United Nations in 2015⁶⁹, as part of the 2030 Agenda for Sustainable Development and constitute a universal, non-binding, comprehensive framework of 17 global objectives aiming at tackling worldwide challenges, encompassing indicative poverty, hunger, health, education, inequality, climate change and environmental degradation. Among the 17 SDGs, SDG 7 on affordable and clean energy, SDG 11 on sustainable cities and communities, SDG 12 on responsible consumption and production and SDG 13 on climate action are in direct link with green finance and Green Bonds, thus being a clear guide and target for Green Bond interested parties and a catalyst for Green Bond market, pushing investors towards green investments. Such a link between Green Bonds and SDGs can create a wide investor pool as it includes more objectives seeking long-term returns, good publicity and positive social impact.

The SDGs have been incorporated voluntarily into EU policies, while also, frameworks, such as the Green Bond Standard, ICMA's Green Bond Principles -which mandate transparency on the use of proceeds- Climate Bonds Standard -with criteria for sectorial impacts- and the Sustainability-Linked Bond Principles (SLBP) incentivize potential investors to contribute to SGD targets and support global sustainability targets. Together these frameworks can foster accountability and push investors' confidence in the Green Bond market.

iii. European Green Deal

The European Green Deal⁷⁰, introduced in 2019, is based on the EU's ambition under the UN 2030 Agenda, constituting a set of legally binding climate targets, national energy and

⁶⁷ Paris Agreement, Article 9 par. 3.

⁶⁸ For more information, please see Green Climate Fund. About the Green Climate Fund. Accessed October 30, 2024. <https://www.greenclimate.fund/about>.

⁶⁹ United Nations. Transforming Our World: The 2030 Agenda for Sustainable Development. A/RES/70/1. New York: United Nations, 2015. <https://sustainabledevelopment.un.org/post2015/transformingourworld>. And United Nations Department of Economic and Social Affairs. The Sustainable Development Goals Report 2023. New York: United Nations, 2023. <https://unstats.un.org/sdgs/report/2023/>.

⁷⁰ European Commission (2019): The European Green Deal, Communication from the Commission to the European Parliament, the European Council, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of the Regions, COM/2019/640 final, March 2019, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52019DC0640> . For an overview see: European Commission. The European Green Deal. COM(2019) 640 final, December 11, 2019. <https://eur-lex.europa.eu/legal-content/EL/TXT/HTML/?uri=CELEX%3A52019DC0640&from=EN>.

climate plans (NECPs) and reporting required guidelines towards the goal of carbon neutrality by 2050 and the transformation of the EU into a zero-emission economy, independent from the use of fossil fuels via reducing GHG emissions, investing in green technologies and transitioning into a circular economy. In 2020, its financial pillar was introduced, the European Green Deal Investment Plan (EGDIP), commonly known as the “Sustainable Europe Investment Plan”⁷¹, underlining the need for private actors and funds for achieving the green transition target. The plans are three (3) dimensions, i.e., (i) mobilizing at least EUR 1 trillion of sustainable investments over the next decade through the EU budget; (ii) developing an enabling framework for private and public investors; and (iii) offering tailored assistance to public administrations and project promoters for sustainable projects ⁷².

The European Union, committed to climate change mitigation, under the Green Deal has taken decisive steps to legally bind its climate goals, primarily through the European Climate Law ⁷³, which came into force in July 2021. This regulation mandates net-zero greenhouse gas emissions by 2050, setting interim targets for 2030 and 2040 and committing to negative emissions beyond 2050. Additionally, initiatives like the European Climate Pact ⁷⁴ further support public awareness and engagement, aiming to inspire and connect stakeholders across all societal levels to actively contribute to climate action ⁷⁵. Under the European Green Deal, policies like the EU Green Bond Standard (EU GBS) were implemented, establishing strict rules and guidelines for the issuance of Green Bonds supporting the credibility and transparency of the Green Bond market and reducing the risk of greenwashing tactics, through the creation of a stable regulatory landscape.

iv. Climate Bonds Standard and Green Bond Principles

The Climate Bonds Standard ⁷⁶, developed in 2010 and launched in 2011 by the Climate Bonds Initiative (CBI) ⁷⁷, is a non-binding, voluntary certification standard that defines certification, sector-specific criteria and green credentials that Green Bond issuers must meet after being verified by an independent Climate Bonds Standard Board, ensuring the use of proceeds. The Board, as an external reviewer, will validate if the bond

⁷¹ European Commission. Sustainable Europe Investment Plan: European Green Deal Investment Plan. Brussels: European Commission, January 14, 2020

⁷² European Commission. Contribution to the Green Deal and Just Transition Scheme. https://investeu.europa.eu/contribution-green-deal-and-just-transition-scheme_en?prefLang=it.

⁷³ European Union. Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 Establishing the Framework for Achieving Climate Neutrality and Amending Regulations (EC) No 401/2009 and (EU) 2018/1999 (European Climate Law). Official Journal of the European Union, July 9, 2021. <https://eur-lex.europa.eu/legal-content/EL/TXT/?uri=CELEX:32021R1119>.

The European Climate Law establishes mechanisms for monitoring and adjusting national actions, supported by scientific guidance and regular five-year reviews aligned with the Paris Agreement’s global stockage. The law emphasizes fair burden-sharing and solidarity among Member States, promoting cross-sectoral cooperation for achieving climate neutrality.

⁷⁴ European Commission. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: European Climate Pact. COM (2020) 788 final, December 9, 2020. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:788>

⁷⁵ European Commission. European Climate Pact: Engaging Citizens and Communities in Climate Action. Brussels: European Commission https://ec.europa.eu/clima/eu-action/european-green-deal/european-climate-pact_en.

⁷⁶ Climate Bonds Initiative. Climate Bonds Standard Version 4.1. <https://www.greenfinanceplatform.org/sites/default/files/downloads/tools/climate-bonds-standard-v4-1-202403.pdf>

⁷⁷The Climate Bonds Initiative (CBI) is an international nonprofit organization that promotes large-scale investments in projects and assets needed for a low-carbon economy. It provides standards, certifications, and research to guide investors and issuers in the green bond market, aiming to increase transparency and build trust. <https://www.climatebonds.net>.

encompasses the pre-requirements to be characterized as Green Bond ⁷⁸ and if the investor conforms with the processes and monitoring mechanisms ⁷⁹. The aforementioned criteria are pre-issuance ⁸⁰ and post-issuance ⁸¹ and the investor seeks to acquire, at both phases, the relevant Climate Bond Certification. The Climate Bond Standard aspires to offer a stringent and well-structured approach in order to ensure that the funds will be used to finance green projects and assets that are consistent with delivering a low carbon economy and transitioning towards a climate resilient economy, with a clear focus on avoiding greenwashing. Finally, this Standard is well aligned with the EU Taxonomy Regulation, as for a bond to be certified, the projects must also meet the taxonomy criteria, ensuring consistency across the EU market. While CBS and GBP establish voluntary standards, the EU Green Bond Standard goes further by mandating compliance, ensuring consistent application, and incorporating rigorous verification mechanisms.

The Green Bond Principles (GBP), introduced by the International Capital Market Association (ICMA)⁸² constitute a set of voluntary classification standards promoting transparency and integrity. Under the GBP, a Green Bond is defined as “*any type of bond instrument where the proceeds or an equivalent amount will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible Green Projects and which are aligned with the four core components of the GBP*”⁸³ the basic cumulative key requirements can be extracted as following (i) application of proceeds; (ii) eligibility of the Green Project; and (iii) alignment with the core components of the GBP and two recommendations on (a) the Green Bond Frameworks and (b) external reviews. In 2022, in the appendix attached to GBP -also known as the “Guidance Handbook”⁸⁴- ICMA defined the four types of Green Bonds, aligning with the EU’s goal of creating a transparent, harmonized, and accountable green finance market. This structured approach provides clear guidelines for the investors, fostering a trustworthy environment for sustainable investments. ICMA’s GBP also showcases an emphasis on impact reporting, encouraging issuers to disclose environmental metrics (e.g., CO₂ emissions avoided, energy savings, water usage reduction) enhancing accountability and

⁷⁸ A Green Bond under the Climate Bond Standard is considered to be a bond “where the proceeds will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible green projects, and which is aligned with the four core components of the Green Bond Principles or the Green Loan Principles”.

⁷⁹ For more information, please see Ehlers, Torsten, and Benoît Packer. Green Bond Finance and Certification. BIS Quarterly Review, September 2017. Bank for International Settlements. https://www.bis.org/publ/qtrpdf/r_qt1709h.pdf.

⁸⁰ In the pre-issuance phase for Climate Bonds Standard (CBS) certification, issuers must meet several requirements: they must select nominated projects and assets, establish internal processes, and provide pre-issuance reporting on their alignment with CBS, detailing the use and management of proceeds and the bond's environmental goals within their sustainability strategy. Post-issuance, issuers must publish an annual report covering allocation, eligibility, and impact—where allocation reporting shows the distribution of proceeds, eligibility confirms compliance with green standards, and impact (though optional) discloses the environmental outcomes of funded projects. Ibid

⁸¹ In the post-issuance phase, issuers must meet specific criteria under the Climate Bonds Standard. This includes adhering to general eligibility requirements, ensuring that allocated projects and assets remain “green,” and fulfilling additional standards for certain bond types to maintain compliance and transparency.

⁸² ICMA (International Capital Market Association) was founded in 2005, succeeding the International Securities Market Association (ISMA, 1992) following the transformation of the Association of International Bond Dealers (1969) after a merger with the International Primary Market Association. ICMA’s primary mission is to promote resilient, well-functioning international debt securities markets that support sustainable economic growth and development. For more on ICMA’s history, see <https://www.icmagroup.org/About-ICMA/history/> and <https://www.icmagroup.org/About-ICMA/mission/>

⁸³ International Capital Market Association. Green Bond Principles. (2021a), p. 3 et seq. <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp>.

⁸⁴ International Capital Market Association. Guidance Handbook. <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/guidance-handbook>.

transparency in the Green Bond market, aligning with the EU's goal of creating a transparent, harmonized, and accountable green finance market.

The Climate Bonds Standard and the Green Bond Principles have shaped the Green Bond market across the globe, as different local markets are aligning. GBP, as a flexible guide for Green Bond issuance, has impacted the markets of Europe but also Asia and the Americas. The EU's regulatory framework draws on these international standards to reinforce its own initiatives and incorporates internationally recognized best practices, such as the EU Green Bond Standard (EU GBS), ensuring that European green bonds are recognized as credible and impactful worldwide. For example, Japan's⁸⁵ and Brazil's⁸⁶ Green Bond markets have used the GBP as a foundational guideline to support Green Bond issuance and boost investors' confidence. In the same spectrum, CBS certification has gained global recognition. Countries like South Africa, Canada and Australia use CBS to enhance credibility in industries like clean energy, renewable technology and sustainable agriculture.

v. European Commission's Green Bond Standard and the European Green Bond Regulation

The European Commission's Green Bond Standard (EU GBS), as first proposed by the European Commission in June 2021⁸⁷, started as a voluntary framework as part of the EU Sustainable Finance Strategy and evolved into being part of the EU's broader efforts towards sustainable finance while aligning with the European Green Deal, the EU Taxonomy and the Sustainable Finance Disclosure Regulation (SFDR)⁸⁸. More specifically, the EU GBS established a set of strict criteria on issuers, which are compatible with the EU taxonomy's criteria and use of proceeds, and define which are the environmentally sustainable activities that can constitute eligible projects for Green Bond issuers and ensure that the proceeds from green bonds are used for projects that meet specific environmental objectives outlined in the EU Taxonomy⁸⁹, such as climate change mitigation, pollution prevention, and the protection of ecosystems. If the issuer reaches a minimum threshold of taxonomy eligible activities, they will adopt the "EU Green Bond"

⁸⁵ Japan Bank for International Cooperation (JBIC). Green Bond Framework. https://www.jbic.go.jp/en/ir/image/JBIC_greenbond_framework_en.pdf.

⁸⁶ World Bank. Brazil Sovereign Sustainable Bond: Financing a Greener, More Inclusive, and Equitable Economy. Case Study: Brazil - Sustainable Bond Technical Assistance. <https://thedocs.worldbank.org/en/doc/417ca2bc8b58320ac065b213f896c851-0340012024/original/Case-Study-Brazil-Sustainable-Bond-TA.pdf>.

⁸⁷ On 6 March 2019, the Technical Expert Group on Sustainable Finance (TEG) published an interim report on an EU Green Bond Standard for public feedback and its final report in June 2019. TEG proposed that the European Commission should create a voluntary, non-legislative EU Green Bond Standard in order for the green bond market to be more efficient, transparent, comparable and credible and also to encourage both issuers and investors to respectively issue green bonds in EU. After evaluation of the public feedback and an internal impact assessment, the EC was tasked to make a legal proposal for an EU GBS. See European Commission. Targeted Consultation Document: Establishment of an EU Green Bond Standard. https://finance.ec.europa.eu/document/download/76bb42bd-acf6-410b-b39f-073852ff14ac_en?filename=2020-eu-green-bond-standard-consultation-document_en.pdf.

⁸⁸ European Union. 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 (Sustainable Finance Disclosure Regulation - SFDR). Official Journal of the European Union, December 9, 2019.

⁸⁹ According to Article 26 (2) of the Taxonomy Regulation, the EC was mandated to publish a report by end of 2021 defining the provisions that would be required to extend the scope of the Taxonomy Regulation beyond environmentally sustainable economic activities and to cover, among others, other sustainability objectives, such as social objectives. For a more detailed analysis, see Platform on Sustainable Finance. Final Report on the EU Taxonomy. European Commission, 2021. https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance/platform-sustainable-finance_en

label, indicating that the bond's use of proceeds is exclusively allocated to projects aligned with the EU Taxonomy⁹⁰.

Another important aspect of the EU GBS is that it requires mandatory external verification throughout the lifespan of the Green Bond and detailed reporting of the allocation of proceeds. These stringent requirements dictate that the issuer must obtain a verification from accredited third-party reviewers registered with the European Securities and Markets Authority (ESMA), that will confirm the compliance of the project and that the funds will be placed in genuinely green projects, thus adding to the credibility of the Green Bond market, providing a framework of settled standards, clear and strict for all interested investors and mitigating greenwashing risks. Such a stable market landscape will be appealing for investors offering security, reserves and diversification of their portfolio, especially for those institutional investors aiming at environmental, social, and governance (ESG) mandates⁹¹.

The European Green Bond Regulation⁹², enacted on 22 November 2023, took the EU GBS one step further as it formalized this framework into a well-structured, legally binding, legislative standard for Green Bond issuers within the EU. The Regulation will apply from 21 December 2024, setting down a uniform, formalizing landscape for the requirements and criteria of the issuer, introducing mandatory pre- and post-issuance reporting and external verification, providing relevant templates and creating a registration and supervisory system for external reviewers of EUGB. The new Regulation, being a legally binding document, will move beyond the previous voluntary guidelines and offer legal certainty to the investors and strong integrity to the Green Bond market, fostering the investor's trust in the "EU Green Bond" label.

vi. "NextGenerationEU"

European Commission President Ursula von der Leyen stated: "[...] *Our willingness to act must live up to the challenges we are all facing. With Next Generation EU we are providing an ambitious answer*".⁹³ The "NextGenerationEU" (NGEU)⁹⁴ constitutes a large-scale recovery plan responding to the coronavirus crisis and supporting the economic recovery and builds a greener, more digital and more persistent future while also aligning with EU's ambitious goal of achieving climate neutrality by 2050, the Taxonomy Regulation and BBP principles⁹⁵. Its funds derive via the issuance of Green Bonds, which contain the first Green Bond issued by the European Commission on 12 October 2021 and is financed 30% -almost €250 billion- from the EU, making the EU one of the biggest global issuers of

⁹⁰ Also see Gilotta, Sergio. Green Bonds and the EU Legal Framework: An Updated Overview. 2023. Accessed October 30, 2024. <https://www.orizzontideldirittocommerciale.it>.

⁹¹ Also see Lehmann, Alexander. "The EU Green Bond Standard: Sensible Implementation Could Define a New Asset Class." Bruegel, July 2021. Accessed October 30, 2024. <https://www.bruegel.org/2021/07/the-eu-green-bond-standard-sensible-implementation-could-define-a-new-asset-class/>.

⁹² European Union. Regulation (EU) 2023/2631 of the European Parliament and of the Council of 22 November 2023 on European Green Bonds and Optional Disclosures for Bonds Marketed as Environmentally Sustainable and for Sustainability-Linked Bonds. Official Journal of the European Union L 2631, November 30, 2023. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R2631>.

⁹³ European Commission. "Europe's Moment: Repair and Prepare for the Next Generation." Press release, May 27, 2020. https://ec.europa.eu/commission/presscorner/detail/en/ip_20_940.

⁹⁴ European Commission. Second Party Opinion on the Framework. https://commission.europa.eu/document/download/345f2b64-f959-482d-98c4-497418b164da_en?filename=v.e._second_party_opinion_on_the_framework.pdf.

⁹⁵ The BBP Principles, or Best Practice Principles, are guidelines designed to establish transparency, accountability, and consistency within specific markets or sectors that emphasize clear reporting, rigorous evaluation of projects, and adherence to ethical standards to ensure market integrity and investor confidence.

Green Bonds. The NGEU is partially binding for the EU member states that receive the funding.

The NextGenerationEU (NGEU) recovery plan is intrinsically linked to green investments as it allocates a significant portion of its total funds, at least 37%, to climate-related projects, in line with the EU's Green Deal and climate neutrality targets by 2050. The funds raised for NGEU will be –while always complying with the EU Taxonomy core principle of “do no significant harm” (DNSH)- invested across three pillars: a) support Member States’ investment and reforms via the Recovery and Resilience Plan⁹⁶, the REACT-EU initiative⁹⁷, the Just Transition Fund⁹⁸ and the European Agricultural Fund for Rural Development⁹⁹, b) invest in private investments and c) address issues raised from the crisis (mainly in the healthcare sector), ensuring that its investments drive genuine sustainability. Its funding mechanism, reliant on the issuance of green bonds, directly influences the green bond market by setting high standards and providing an unprecedented scale of investment in sustainable finance.

NGEU-funded projects span critical areas such as clean energy transitions and digitalization efforts, providing targeted support to EU Member States and empowering them to integrate green objectives. These initiatives are fostering a sustainable and inclusive economic recovery, with measurable strides toward achieving the EU's climate neutrality targets. The issuance of €250 billion in Green Bonds as part of the NGEU not only underscores the EU's commitment to environmental sustainability and the transition toward a climate-resilient economy but also cements its leadership role in the Green Bond market by demonstrating how large-scale, strategic funding can accelerate economic resilience and green innovation across multiple sectors.

CHAPTER 3: Public Law Incentives for Green Bond Investments

A. European Transition Goal through Green Bond- Funded Projects

The European Union (EU) has been at the forefront of global efforts to combat climate change, with ambitious targets outlined in its European Green Deal. A central component of achieving these targets involves the transition to renewable energy, requiring substantial financing to develop clean energy infrastructure and phase out fossil fuel dependency. Green bonds have emerged as a key tool in mobilizing capital for environmentally sustainable projects, while public law incentives and innovative financing mechanisms play a crucial role in supporting and expanding their use to accelerate the green transition.

⁹⁶ The Recovery and Resilience Facility (RRF) is a €560 billion EU initiative providing targeted grants and loans to support Member States in achieving green and digital transitions, economic resilience, and alignment with EU priorities, especially for those most impacted by the COVID-19 pandemic. Ibid.

⁹⁷ The REACT-EU initiative includes a €55 billion top-up for current cohesion policy programs, allocated through 2022 to regions most affected by the socio-economic impacts of the crisis, focusing on factors like youth unemployment and regional prosperity. Ibid.

⁹⁸ A proposal to expand the Just Transition Fund to €40 billion aims to support Member States in accelerating their transition toward climate neutrality. Ibid.

⁹⁹ The European Agricultural Fund for Rural Development will receive a €15 billion boost to help rural areas make structural changes in line with the European Green Deal and support biodiversity and Farm to Fork targets. Ibid.

i. Financing mechanisms: Public Law Incentives as Enablers

As climate change concerns intensify, public law incentives, provided through EU policies and regulatory frameworks (such as the European Green Deal and the EU Taxonomy Regulation), have emerged as critical enablers of innovative financial mechanisms to mobilize capital and transition towards renewable energy and sustainable economic growth via green projects that align with the European Transition Goal by reducing financial barriers and creating favourable conditions for the potential investors.

At the forefront of Green Bond financing are public issuances by governments and multilateral institutions. These bonds are supported by public law incentives such as tax benefits, subsidies, and by regulatory frameworks, which help lower the costs and risks associated with issuing and investing in Green Bonds. This type of Green Bonds, also known as Sovereign Green Bonds, allows governments to raise capital to fund environmentally friendly projects aligned with sustainability goals, such as renewable energy initiatives, energy-efficient buildings, low-carbon public transportation and green infrastructures¹⁰⁰. Sovereign Green Bonds attract both national and international investors, providing a stable funding source and playing an important role in supporting national climate goals and achieving the NDCs and overall green transition strategies. These bonds are widely used by governments to showcase their place in global environmental leadership and motivate the respective local Green Bond market. For instance, Poland, France, the Netherlands, Germany¹⁰¹ have been pioneers in the issuance of Sovereign Green Bonds having leveraged public law incentives, such as tax reliefs, enhanced reporting standards, and government-backed frameworks¹⁰². Also, institutions like the World Bank and the European Investment Bank (EIB) have been issuing Green Bonds of similar class supporting the foundations of this market segment. The European Union, as part of funding the NextGenerationEU recovery plan, issues sovereign-like bonds to fund up to 30% the program and demonstrates how public law initiatives can catalyze large-scale investment in renewable energy and energy-efficient infrastructure. Public law incentives ensure transparency and accountability through mandatory reporting and compliance with the EU Green Bond Standard (EU GBS), responding to Sovereign Green Bonds demand to avoid risks like “greenwashing”.

From the private sector aspect, private actors too benefit from public law incentives that encourage the issuance of Corporate Green Bonds, which serve a similar function. The EU Taxonomy and public law incentives, like grants or preferential lending terms, enable channeling private capital specifically into green projects contributing to decarbonization efforts, energy efficiency upgrades, or clean energy generation and enhancing the economic feasibility of green investments. Corporations envisage the potential of green finance to attract environmentally conscious investors while having a positive impact on the environment. Corporate Green Bonds have been very popular with companies that seek to meet the environmental, social, and governance (ESG) criteria and create a good

¹⁰⁰ International Monetary Fund. Sovereign Green Bonds: A Catalyst for Sustainable Debt Market Development. June 14, 2024. <https://www.imf.org/en/Publications/WP/Issues/2024/06/14/Sovereign-Green-Bonds-A-Catalyst-for-Sustainable-Debt-Market-Development-550527>.

¹⁰¹ Also see Climate Bonds Initiative. "Labelled Green Bonds Data: Latest 3 Months." Accessed November 17, 2024. <https://www.climatebonds.net/cbi/pub/data/bonds>.

¹⁰² For instance, Poland was the first country in the world to issue a Sovereign Green Bond in 2016, utilizing state-backed regulatory frameworks and tax incentives, including excise tax exemptions, subsidies and projects. to finance renewable energy projects, sustainable agriculture, and clean transportation initiatives. Climate Bonds Initiative. Sovereign Green Bond Briefing: 2017 Highlights. 2017. Accessed November 25, 2024. https://www.climatebonds.net/files/reports/sovereign_briefing2017.pdf.

reputation using this integration as a marketing tactic, proving their commitment to sustainability to stakeholders and consumers. Noteworthy examples are Apple, Toyota¹⁰³ and energy firms¹⁰⁴ that issued Corporate Green Bonds to fund green projects, while also, the Greek renewable energy company, Terna Energy, has been a pioneer in leveraging green bonds to finance and expand its sustainable initiatives. Notably, the company issued a €150 million green bond in 2019 and benefited from Greece's Renewable Energy Sources (RES) legislation¹⁰⁵, which provided preferential feed-in tariffs for renewable energy projects, and the EU-funded grants through the National Strategic Reference Framework (NSRF) program supporting sustainable development.

Beyond these traditional financial mechanisms, innovative financing models such as sustainability-linked loans and green securitization are gaining traction. Sustainability-linked loans (SLLs)¹⁰⁶ are complementary to the Green Bond market, financial tools where the terms of the loan, such as the interest rate, are directly linked to the borrower's success in achieving environmental, social, or governance (ESG) performance goals and are incentivized through state-backed programs that encourage companies to achieve these targets by offering interest rate reductions. The proceeds are not specified, and the borrower can use the loan for funding general corporate purposes, not specifically green projects, as long as the borrower commits to improving their sustainability metrics. The SLL encourages the borrower's overall sustainability performance and monitors the obligation to meet ESG targets via third-party assessors¹⁰⁷. Companies can use SLLs to meet Green Bond standards and improve their environmental performance. The asset-backed green bonds or securitized green bonds¹⁰⁸ are financial securitization mechanism backed by public guarantees or EU-supported platforms like the Green Investment Platform that allows for converting illiquid green assets into securities that can be traded in the market, making them attractive to institutional investors. This mechanism involves pooling green assets, such as solar installations, green mortgages, or energy-efficient properties that are unmarketable and using them as collateral to issue asset-backed securities. The cash flows created by these green assets are used as the primary source for the repayment of the Green Bond. This financial mechanism helps diversify the risk and improve the market liquidity with a broader range of investor participation. Using such mechanisms, the EU attracts a wide range of investors ensuring funding of renewable energy transition projects and the achievement of sustainability objectives.

Green Bond Funds are funds that emerged to further enhance the flow of capital in green projects, driven by supportive public policy frameworks and strategic incentives. They

¹⁰³ Toyota Financial Services. "Toyota's First Green Bond". Toyota, 2014. <https://www.toyotafinancial.com>.

¹⁰⁴ Some noteworthy examples are Adani Green Energy Limited (AGEL), which in 2019 became the first Indian company to offer investment-grade U.S. dollar green bonds, raising \$362.5 million to fund renewable energy initiatives. In June 2024, Air Liquide issued a €500 million green bond to finance energy transition projects, including low-carbon hydrogen production and carbon capture technologies. Also, in March 2024, Constellation Energy issued the first corporate green bond in the United States designated for nuclear energy projects, underscoring its commitment to carbon-free energy production. See <https://www.constellationenergy.com/newsroom/2024/Constellation-Offers-Nations-First-Corporate-Green-Bond-for-Nuclear-Energy.html>

¹⁰⁵ Government of Greece. Law 3851/2010: Acceleration of the Development of Renewable Energy Sources to Address Climate Change and Other Provisions Pertaining to the Competitiveness of the Greek Economy. Official Gazette of the Hellenic Republic, Issue A, No. 85, June 4, 2010

¹⁰⁶ Houlihan Lokey. An Introduction to Sustainability-Linked Loans. Accessed November 17, 2024. <https://hl.com/media/2w5f45dy/an-introduction-to-sustainability-linked-loans.pdf>.

¹⁰⁷ Also see Loan Syndications and Trading Association. Sustainability Linked Loan Principles (SLLP). Accessed November 17, 2024. <https://www.lsta.org/content/sustainability-linked-loan-principles-sllp/>.

¹⁰⁸ European Banking Authority. EBA Report on Sustainable Securitisation. 2022. Accessed November 17, 2024. https://eba.europa.eu/sites/default/files/document_library/Publications/Reports/2022/1027593/EBA%20report%20on%20sustainable%20securitisation.pdf.

gather investments from various investors, individuals, or institutions and channel them into a diversified portfolio of Green Bonds¹⁰⁹. These funds are often supported by public law incentives, such as subsidies, preferential tax treatments, or co-financing from EU programs like the European Regional Development Fund (ERDF), making them more appealing to investors. Some noteworthy examples are the European Green Bond Fund, and the European Green Bond Fund (EGBF)¹¹⁰ showcase how leveraging public law incentives to lower financial risks and attract private investment can effectively mobilize capital towards Green Bond markets. Another interesting mechanism is the Green Investment Platforms that also emerged as complementary to financing green projects. These platforms are collaborative initiatives that bring together public and private partnerships in order to mobilize capital and reduce transaction costs. Some noteworthy examples are the Global Infrastructure Facility (GIF)¹¹¹ and the Green Climate Fund (GCF)¹¹² that have managed to bring together a wide range of investors. More generally, blended finance mechanisms bring together public and private funds, mitigating risks associated with large-scale infrastructure projects and mobilizing climate finance at scale. By combining resources, blended finance can lower investment risks for private actors and unlock more capital for critical projects such as offshore wind farms and smart grid technologies. The collaboration between public and private actors can enhance the financial viability of renewable energy projects, ensuring that they align with broader sustainability goals while also addressing energy security concerns. These arrangements are often eligible for co-financing or technical assistance through EU mechanisms like the Horizon Europe program or the InvestEU fund, further incentivizing participation.

ii. Public Law Incentives and Subsidies Driving Green Bonds in the EU

In the European Union, policymakers such as the European Commission, the European Investment Bank (EIB), and national governments of member states play a pivotal role in enhancing the attractiveness of Green Bonds via various incentives, including tax breaks, capital grants, and loan guarantees, preferential treatment for green bond issuers and subsidies in order to lower the cost of capital for renewable energy projects and increase the attractiveness of the financial instruments, encouraging broader participation from investors. Incentives and subsidies¹¹³ are important tools that aim to accelerate Green Bond investments, aligning with the EU's transition to renewable energy goals, and overall broader climate goals. Central to this cause are the EU Taxonomy for Sustainable Activities, the EU Green Bond Standard (EU GBS), and funding mechanisms under the European Green Deal, which via regulatory frameworks, provide targeted financial assistance in order to overcome market barriers, like lack of awareness or understanding

¹⁰⁹ SustainableInvest. Green Bond Funds Update - April 2023. Accessed November 17, 2024. <https://sustainableinvest.com/green-bond-funds-update-april-2023/>.

¹¹⁰ The European Green Bond Fund (EGBF), managed by the European Investment Bank, leverages public law incentives such as guarantees and co-financing from the EU's InvestEU program to lower financial risks and attract private investment. As of 2022, the fund had mobilized over €500 million in green bond investments, supporting projects estimated to reduce greenhouse gas emissions by 1.2 million tons annually. See European Investment Bank. Sustainability Report 2022. Luxembourg: European Investment Bank, 2023. <https://www.eib.org/en/publications/20230023-sustainability-report-2022>.

¹¹¹ See World Bank Group. "Global Infrastructure Facility (GIF)." <https://www.worldbank.org/en/programs/global-infrastructure-facility>.

¹¹² Green Climate Fund. "About the GCF." <https://www.greenclimate.fund/about>.

¹¹³ Baldacci, Bastien, and Dylan Possamai. "Governmental Incentives for Green Bonds Investment." *Mathematics and Financial Economics* 16 (2022): n.p. <https://doi.org/10.1007/s11579-022-00320-w>.

of green bonds and reduce the cost of Green Bond investments. In this way the EU's target of climate neutrality by 2050 of the European Green Deal is directly supported, as through incentives and subsidies investors are mobilized into investing funds towards green initiatives.

The tax incentives are a widely used tactic to promote Green Bond investments. Common tax incentives include tax credit in qualifying for Green Bonds¹¹⁴, direct subsidy bonds¹¹⁵, tax-exempt bonds¹¹⁶, which provide tax exemptions on interest gained from Green Bonds and indirect subsidies accelerating depreciation allowances for assets financed by Green Bonds. Within the EU several bonds offer tax-exemptions, making them more attractive to investors that seek low-risk and tax-efficient investments, encouraging renewable energy projects funded by Green Bonds. In the same way, other countries provide tax credits or deductions for incentivizing Green Bonds. While tax incentives are in general beneficial for the investors, as they manage to significantly lower the cost of capital, they need to be carefully designed and monitored as they could lead to market distortion if they are selective and provided only to specific types of Green Bonds. Overly selective or narrowly defined tax incentives may discriminate in favor of a limited range of projects or investors, undermining competition and limiting the Green Bond market¹¹⁷.

Utilization of subsidies and capital grants, as direct financial support, plays a significant role in the attractiveness of renewable energy projects as they reduce the upfront cost, which in this kind of project is primarily high and constitutes a barrier to the deployment of such projects. Subsidies enhance the appeal of green bonds by providing interest cost reductions and stimulating market demand, which lead to a 'greenium' effect, where green bonds are issued at a lower yield than their conventional counterparts¹¹⁸. Between the EU's numerous examples of funding programs, the European Green Deal stands out, seeking to mobilize at least €1 trillion in the sustainable investment market over the next few years¹¹⁹. Through this initiative substantial subsidies and capital grants are offered, especially for renewable energy projects and sustainable infrastructures, to lower the cost of the investment for the issuer. In this way, Green Bonds become more easily accessible and more appealing to investors. Public funds have also been established in

¹¹⁴ Supra 56

¹¹⁵ Supra 57

¹¹⁶ Supra 58

¹¹⁷ Also see Letta, E. (n.d.). Much More than a Market. Council of the European Union. Retrieved from <https://www.consilium.europa.eu/media/ny3j24sm/much-more-than-a-market-report-by-enrico-letta.pdf> and European Commission. Final Report: Taxation of Venture Capital and Business Angels in the EU. European Union, 2017. https://taxation-customs.ec.europa.eu/system/files/2017-06/final_report_2017_taxud_venture-capital_business-angels.pdf.

¹¹⁸ Flammer, C., 2019. Green Bonds: Effectiveness and Implications for Public Policy. *Environmental and Energy Policy and the Economy*, 1, pp. 95 - 128.

¹¹⁹ Worth mentioning initiatives, under the scope of the European Green Deal, are also The Just Transition Mechanism (JTM) and Horizon Europe. The Just Transition Mechanism (JTM) is a key component of the European Green Deal, aimed at providing targeted financial support to regions and industries most affected by the transition to a climate-neutral economy. By offering financial incentives, including subsidies, grants, and other support mechanisms, the JTM ensures that no region is left behind in the shift to sustainable energy. These incentives create new opportunities for green bond investments by lowering the financial barriers to transitioning to renewable energy and other sustainable practices. See European Commission. The Just Transition Mechanism: Making Sure No One Is Left Behind. European Union. Available at: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/just-transition-mechanism_en.

Horizon Europe provides funding for research and innovation in green technologies, fostering the development of new solutions that can be supported through green bonds. By reducing the financial risk associated with innovation, Horizon Europe encourages investment in cutting-edge renewable energy technologies, increasing the diversity and scope of green bond-funded projects. See European Commission. Horizon Europe: The EU Research and Innovation Programme (2021-2027). European Union. Available at: <https://ec.europa.eu/programmes/horizon2020/>.

Europe on a national level. For example, France's Green Obligations Assimilables du Trésor (OATs) utilizes a mix of grants to fund sustainable projects, demonstrating the effectiveness of government backing¹²⁰. Upfront capital grants reduce the overall cost of capital for Green Bonds and counteracts the high compliance and administrative costs the investors face, encouraging new projects but also supporting the existing ones in meeting high environmental standards. Another type of subsidies that is usually offered by governments and multilateral development banks (MDBs) is the interest rate subsidy that reduces the borrowing cost of the Green Bond. This makes the funding of renewable energy projects cheaper for issuers and in a better place competing with conventional investments, thus attracting more capital to the green sector¹²¹.

In order to decompress the risk of Green Bond investments, public bodies, such as the European Investment Bank (EIB) and the European Fund for Strategic Investments (EFSI), provide loan guarantees and risk mitigation measures to enhance the credit power of Green Bonds and make them more attractive to potential investors. These guarantees reduce the risk that is associated with financing renewable energy projects, facilitating access to more favorable financing terms¹²². Public guarantees function as a safety net protecting investors from potential losses that are not unusual in the Green Bond market and renewable energy projects. MDBs, such as the European Investment Bank (EIB), have given concessional loans and grants¹²³ for Green Bond financing in order to push more investors to fund green projects and renewable energy projects. EIB loan guarantees have managed to secure private financing for wind and solar projects, overcoming the reluctant investors due to perceived risks.

Blended finance combines public funds with private investment to enhance the financial viability and scalability of green projects. By leveraging public funds as a catalyst, blended finance mechanisms reduce investment risk and increase returns for private investors. The EU's InvestEU program¹²⁴ and the Just Transition Mechanism¹²⁵ are prime examples, pooling public and private resources to fund green bond initiatives that align with the European Green Deal's sustainability objectives. Blended finance has proven effective in attracting institutional investors who might otherwise be wary of entering the green bond market due to high risks or low returns.

¹²⁰ France's Green Obligations Assimilables du Trésor (OATs) are sovereign green bonds issued by the French government to finance projects that contribute to climate change mitigation, biodiversity protection, and sustainable development. Since their launch in 2017, they have positioned France as a leader in sovereign green bond markets by providing a significant source of funding for environmental initiatives. OECD. Sustainable finance definitions in France. DEVELOPING SUSTAINABLE FINANCE DEFINITIONS AND TAXONOMIES. OECD Publishing, 2020. Retrieved from <https://www.oecd-ilibrary.org/docserver/4e906719-en.pdf?expires=1731959421&id=id&accname=guest&checksum=E3E65525E3E1C6D5F75D45E74BF4E630>.

¹²¹ Climate Bonds Initiative. Financial policies to enable whole economy transition. Retrieved from <https://www.climatebonds.net/policy/101-policymakers/finance>.

¹²² Buchetti, Ixart Miquel-Flores, Salvatore Perdichizzi, Alessio Reghezza. Greening the economy: how public-guaranteed loans influence firm-level resource allocation Working Paper No. 2916. European Central Bank, 2023. Retrieved from <https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2916~f95e083a6e.en.pdf>.

¹²³ World Bank. "Catalyzing Private Investments and Climate Finance to Turn Energy Transition Ambitions to Reality." August 4, 2023. Retrieved from <https://www.worldbank.org/en/results/2023/08/04/catalyzing-private-investments-and-climate-finance-to-turn-energy-transition-ambitions-to-reality>.

¹²⁴ European Commission. InvestEU Programme. Retrieved from https://europa.eu/investeu/home_en.

¹²⁵ The Just Transition Mechanism (JTM) mobilizing at least €150 billion between 2021 and 2027, the JTM has facilitated investments in renewable energy, green infrastructure, and reskilling programs, helping communities' transition away from carbon-intensive industries while promoting social and economic equity. The Just Transition Mechanism: Making Sure No One Is Left Behind. European Union. Available at: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/just-transition-mechanism_en.

Public incentives and subsidies play a crucial role in fostering a more liquid, stable, and attractive green bond market by reducing financial barriers and offsetting investment risks associated with sustainable projects. Tax incentives, grants, and favorable loan terms lower the cost of capital, encouraging both institutional and retail investors to participate. These mechanisms help channel private capital into renewable energy and green infrastructure projects, sectors often disadvantaged compared to conventional energy sources. By making these investments more economically viable, subsidies and incentives accelerate the development and scaling of innovative green technologies, reduce overall project costs, and enhance market competitiveness. Additionally, such financial mechanisms promote confidence by offering predictable revenue streams, improving project bankability, and attracting diverse investor bases, thus reinforcing the credibility and growth of sustainable finance markets.

iii. The Interplay Between Public Law Incentives and Green Bond Market Evolution

The EU Green Bond market has undergone remarkable shifts throughout its existence and evolved from a secluded small market to a cornerstone of sustainable financing and a pillar in achieving the EU's climate and energy transition targets, able to mobilize private and public capital towards funding renewable energy projects. The establishment of favorable regulatory and public law frameworks, encompassing tax benefits, subsidies, guarantees, and risk mitigation tools that reduce the finance, the shifts of climate policy objectives and the increasing investors' preference create a complex landscape of market trends.

As already mentioned, Sovereign Green Bonds constitute an important financial mechanism in the Green Bond market and have emerged as a significant market trend, where EU member states lead the global market by issuing a significant amount of these types of bonds¹²⁶. Sovereign green bond issuance has also significant benefits for the development of the sustainable bonds market in the private sector and the Corporate Green Bond market, increasing the market size and depth, liquidity and control of the yield spreads, especially in countries with well-structured and stringent sustainability policies and clear climate and environmental goals¹²⁷. European governments have gained a leading global role, highly committed to sustainable financing practices. France's pioneering €7 billion Green OAT in 2017 was followed by Germany's twin bond concept in 2020 and the Netherlands and Sweden issuing their sovereign Green Bonds funding renewable energy projects such as wind farms and solar power projects¹²⁸. The EU itself issued sovereign-like Green Bonds, planning to finance a €750 billion COVID-19 recovery fund, the NextGenerationEU recovery package (see section 2. b. vi). Corporate Green Bonds are also a market trend, as many corporations across Europe use this financial mechanism to fund their green agenda, especially in sectors like energy, transport, and real estate.

¹²⁶ Also see Gianfrate, Gianfranco, and Matteo Peri. "Understanding the Role of Green Bonds in Advancing Sustainability." Research Gate, 2020. Retrieved from https://www.researchgate.net/publication/339273673_Understanding_the_role_of_green_bonds_in_advancing_sustainability

¹²⁷ International Monetary Fund. Sovereign Green Bonds: A Catalyst for Sustainable Debt Market Development. June 14, 2024. <https://www.imf.org/en/Publications/WP/Issues/2024/06/14/Sovereign-Green-Bonds-A-Catalyst-for-Sustainable-Debt-Market-Development-550527>.

¹²⁸ OMFIF. "European Sovereigns Explore Sustainable Bond Agenda." August 2021. Retrieved from <https://www.omfif.org/2021/08/european-sovereigns-explore-sustainable-bond-agenda/>

For instance, energy companies like Enel¹²⁹ and Iberdrola¹³⁰ are known for issuing Green Bonds of multi-billion euro worth financing renewable energy expansion. Sustainability-Linked Bonds (SLBs)¹³¹, which provide in the green finance sector a performance based financial trend where the performance targets are not met, penalties may apply, and Transition Bonds, favorable for high-emission industries that require gradual decarbonization, are also an emerging financial mechanism as complementary to Green Bonds.

Public Subsidies and Capital Grants also constitute a market trend in the Green Bond market, and they have been rather effective as incentives for Green Bond issuance. These subsidies and grants are often coupled with incentivizing regulatory frameworks, such as easily acquired permits with reduced requirements or fast timelines of the procedures (see sub-sector ii. of this sub-chapter). Blended finance, with participation and collaboration of the private and the public sector, combines public funds with private investment to reduce investment risk and increase returns for private investors and has proven effective in funding large-scale renewable energy projects. Public-Private Partnerships -PPPs- also leverage public support to scale up green bond investments, as seen in large infrastructure projects for wind and solar power across the continent.

The EU Taxonomy for Sustainable Activities, the EU Green Bond Standard (EU GBS) and the EU Green Bond Regulation (EU GBR) represent major public law incentives shaping market trends. The taxonomy defines what constitutes a "green" investment, thereby providing much-needed clarity and preventing greenwashing, which occurs when investments are falsely marketed as environmentally friendly, while the EU GBS and EU GBR establish requirements for Green Bonds, reporting mechanisms and evaluation criteria. The regulatory framework provides a clear landscape, creating a market characterized by transparency and integrity. Standardized frameworks and reporting templates, such as those promoted by the Climate Bonds Initiative (CBI) support the need for detailed reports, transparency and accountability that are a constant need of the issuers.

The European Union's climate targets, as outlined in the Paris Agreement, are reflected in its Nationally Determined Contributions (NDCs), emphasizing renewable energy expansion as a key element of climate action¹³². Green bonds play a crucial role in financing projects that need to meet these targets, with public law incentives driving

¹²⁹ Enel issued its first green bond in January 2017, raising €1.25 billion to finance renewable energy projects and enhance energy efficiency across its global operations. By 2020, Enel had allocated over €10 billion through subsequent green bonds, significantly contributing to the expansion of wind and solar capacity, reducing its carbon footprint, and supporting its target to achieve full decarbonization by 2050. See Enel Successfully Launches Its First Green Bond. 2017. Retrieved from <https://www.enel.com/>

¹³⁰ Iberdrola has issued multiple green bonds, raising more than €13 billion to finance projects such as offshore wind farms, solar parks, and energy efficiency initiatives. By focusing these funds on renewable infrastructure, Iberdrola has become one of the world's largest clean energy producers, significantly contributing to Europe's renewable energy targets and advancing its own carbon neutrality goals by 2050.

"Iberdrola: Pioneering Green Financing." 2020. Retrieved from <https://www.iberdrola.com/>

¹³¹ Also see International Capital Market Association (ICMA). Sustainability-Linked Bond Principles (SLBP). Retrieved from <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-linked-bond-principles-slbp/>

According to Bloomberg NEF data, European SLB issuance grew by 300% between 2020 and 2022, reflecting market demand for performance-based sustainable finance solutions and reached over trillion dollars in 2023. <https://www.bloomberg.com/professional/insights/trading/green-bonds-reached-new-heights-in-2023/>

¹³² Council of the European Union. "Paris Agreement: Council Transmits NDC Submission on Behalf of EU and Member States." Press release, December 18, 2020. Retrieved from <https://www.consilium.europa.eu/en/press/press-releases/2020/12/18/paris-agreement-council-transmits-ndc-submission-on-behalf-of-eu-and-member-states/>.

investment alignment and mobilizing large-scale capital while ensuring adherence to both national and global climate goals. Another important harmonization, supported by the International Capital Market Association (ICMA) and regional collaborations, such as in Asia and Latin America, is the regulatory harmonization towards a global approach of a common framework in terms of standards across different jurisdictions. Such harmonization would increase cross-border investments and reduce market fragmentation and make it easier for investors to fund projects in different regions without facing inconsistencies or regulatory barriers¹³³.

Additionally, an economic phenomenon that makes Green Bonds more attractive to the investors is the so called "greenium," or green premium¹³⁴, that showcases investors' willingness to accept lower yields in order to support sustainability goals¹³⁵. The Green Bond market has also expanded in emerging markets, such as Asia, Latin America, and Africa, with some help from international financial institutions, development banks, and local governments in order to finance green initiatives, such as renewable energy, climate adaptation projects, and sustainable infrastructure¹³⁶. Emerging markets have witnessed diversification in the types of issuers, including banks, corporations, and even smaller municipalities, expanding the reach of green bonds beyond sovereign issuances¹³⁷.

Digital innovations and green fintech solutions are reforming the Green Bond market as they provide ways to enhance transparency and accountability, ameliorating the link between financial markets and global green goals. Blockchain technology can be the answer to many of the problems that the Green Bond market faces in terms of transparency, fragmentation of the market, assessment costs and time¹³⁸. The decentralized and real-time verification that these technologies offer ensures the traceability of the funds and the allocation to designated green projects according to the proceeds of use, as all transactions can be visible and auditable for every dollar spent. This can enhance the trust between the stakeholders relevant to the projects, mitigating concerns about greenwashing. Moreover, utilizing digitizing and automating methods, these blockchain technologies and green fintech platforms can streamline reporting procedures throughout the lifespan of a Green Bond, like due diligence or performance reports, assessment processes, manage risks in infrastructure investment and collect real-time data¹³⁹. These automated procedures will eventually decrease the transaction

¹³³ World Bank. Green Bonds: Working Towards a Harmonized Framework for Impact Reporting. 2019. Retrieved from <https://documents1.worldbank.org/curated/en/678851573042154496/pdf/Green-Bonds-Working-Towards-a-Harmonized-Framework-for-Impact-Reporting.pdf>.

¹³⁴ Larcker D.F. and Watts E. (2019): Where's the Greenium?, Rock Center for Corporate Governance at Stanford University Working Paper No. 239, Stanford University Graduate School of Business Research Paper No. 19-14, Journal of Accounting and Economics, Volume 69, Issues 2-3, April-May 2020, 101312, Available at SSRN: <https://ssrn.com/abstract=3333847> or <http://dx.doi.org/10.2139/ssrn.3333847>

¹³⁵ Also see Flammer, C. (2021). Corporate Green Bonds. Journal of Financial Economics, 142(2), 499-516. <https://www.sciencedirect.com/science/article/pii/S0304405X21000337>

¹³⁶ OECD. Green Bonds: Mobilising the Debt Capital Markets for a Low-Carbon Transition. 2017. <file:///C:/Users/egiakounti/Downloads/9789264272323-en.pdf>

¹³⁷ International Finance Corporation (IFC). Emerging Market Green Bonds Report 2023. 2023. Retrieved from <https://www.ifc.org/content/dam/ifc/doc/2024/emerging-market-green-bonds-2023.pdf>

¹³⁸ Vangelis Malamas, Thomas K. Dasaklis, Veni Arakelian & Gregory Chondrokoukis (01 Nov 2023): A blockchain framework for digitizing securities issuance: the case of green bonds, Journal of Sustainable Finance & Investment, <https://www.tandfonline.com/doi/full/10.1080/20430795.2023.2275212>

¹³⁹ OECD. Blockchain Technologies as a Digital Enabler for Sustainable Infrastructure. 2019. Retrieved from https://www.oecd.org/content/dam/oecd/en/publications/reports/2019/09/blockchain-technologies-as-a-digital-enabler-for-sustainable-infrastructure_c8f24003/0ec26947-en.pdf.

and compliance costs. Finally, the tokenization¹⁴⁰ of Green Bonds would enable easy trading of Green Bonds on a digital forum, improving the liquidity of the Green Bond market and the accessibility for more actors¹⁴¹. Blockchain and fintech technologies will expand the scope of the actors in the Green Bond market, as a wider range of investors will be able to participate in terms of type and size, leading to the democratization of the access, thus also expanding the range of financed projects.

B. Potential Risks and Limitations of Public Law Incentives

Public law incentives have been instrumental in stimulating the green bond market by lowering financial barriers and fostering investment in environmentally beneficial projects, but they are not without potential risks and limitations. Issues such as market distortion, inefficient allocation of resources, and potential misuse or misallocation of funds can undermine their effectiveness. Additionally, complex regulatory frameworks and inconsistent policies across regions may hinder the scalability and attractiveness of green bonds.

1. *Risk Factors of Green Bond Investments*

Green bonds present opportunities for sustainable financing but carry significant risks. Financial viability and performance issues, inconsistent transparency and reporting, regulatory and policy uncertainties, market size and liquidity constraints, and concerns over environmental effectiveness can challenge investors. Additionally, the risk of greenwashing may undermine trust, highlighting the need for robust standards to ensure genuine contributions to sustainability goals. These significant risk factors call upon public law incentives to address them, as, if unmitigated or poorly managed, can undermine the effectiveness of public law incentives.

i. Financial Risks: Economic Viability and Financial Performance

The economic viability and financial performance of Green Bonds are clutch factors that will be assessed by the potential investor and affect their entrance into this market segment. The performance of the Green Bonds and the overall yield for the investor can be affected by various factors. Compared to traditional bonds, Green Bonds are often followed by extra costs and obligations, encompassing certification costs, costs for compliance with EU Taxonomy criteria and respective green standards and the monitoring and reporting responsibilities, making them potentially less attractive than traditional bonds, looking from a solely financial prism¹⁴². To partially offset and counteract these additional costs, public law incentives provide tax credits or direct subsidies, making sure that the Green Bond market is not hindered by these costs and

¹⁴⁰ Tokenization is the process of converting physical or digital assets, such as green bonds, into digital tokens that can be stored, transferred, and traded on a blockchain. This allows for fractional ownership, meaning investors can purchase smaller portions of assets, enhancing liquidity and accessibility in financial markets. Vangelis Malamas, Thomas K. Dasaklis, Veni Arakelian & Gregory Chondrokoukis (01 Nov 2023): A blockchain framework for digitizing securities issuance: the case of green bonds, *Journal of Sustainable Finance & Investment*, <https://www.tandfonline.com/doi/full/10.1080/20430795.2023.2275212>

¹⁴¹ See also World Economic Forum. Building Block(chain)s for a Better Planet. 2018. Retrieved from https://www3.weforum.org/docs/WEF_Building-Blockchains.pdf

¹⁴² On the benefits from green bond issuance and also the potential costs, see Tang, Dragon Yongjun, and Yupu Zhang. "Do Shareholders Benefit from Green Bonds?" November 2018. Accessed November 16, 2024. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3259555

remains competitive and appealing for the potential investor. The financial risk in the Green Bond market can also be augmented by underlying economic and environmental changes that could affect the project's long-term viability. Market volatility, shifting regulatory frameworks, resource scarcity, technological advancements and unproven business models impact the project's ability to generate sufficient returns, influencing the performance of the Green Bond issued to fund them. However, the viability of the underlying projects can be supported by concessional loans or state-backed guarantees offered via public incentives in order to provide a safety net for the investor and enhance their confidence in this market segment.

Green Bonds are traded at a premium to traditional bonds due to perceived lower risk and positive environmental impact, even though they offer lower yields. This “greenium” phenomenon¹⁴³ coupled with inadequate risk assessment from the investor can lead to disappointments due to misalignment between the expectations and the actual financial performance of the green project, especially if the project fails to deliver the expected environmental and economic outcomes¹⁴⁴. The issues arising from the “greenium” can only be augmented by the lack of standardized metrics, criteria and frameworks for assessing and evaluating accurately the risk factors associated with the potential Green Bond-funded project. As part of the overall bond market, the financial performance of Green Bonds can also be affected by broader market conditions, such as economic downturns or shifts in investor sentiment towards sustainability. The EU Green Bond Standard (EU GBS) aims at mitigating this issue by introducing standardized metrics and reporting requirements, while public law incentives can mitigate these challenges, ensuring steady financial backup via subsidies and tax breaks, enabling aligning investor expectations with project outcomes and financial resilience of the underlying projects.

ii. Transparency and Reporting Standards

Another critical risk factor regarding investments in the Green Bond market is the issue of transparency and reporting standards. These standards are utilized in order to ensure that the intended use of proceeds align with the environmental goals of the Green Bond-funded project. The absence of universally accepted standards, clarity on definitions and criteria on what can be considered a “green project”, and poor reporting standards create uncertainty for potential investors, who, if poorly assessed, the environmental impact of the project to be funded, can be led to accusations of “greenwashing” due to falsely claiming environmental benefits, showcasing the need for clear guidelines and enhancement of transparency in reporting practices¹⁴⁵. Public law incentives can alleviate these concerns by providing additional resources or financial backing to issuers

¹⁴³ The greenium refers to the premium investors are willing to pay for green bonds compared to conventional bonds, resulting in lower yields for green bonds due to the perceived value of financing environmentally beneficial projects. The concept emerged alongside the rise of the green bond market as investors increasingly prioritized sustainability, reflecting a willingness to accept reduced returns for environmental impact. Larcker D.F. and Watts E. (2019): Where's the Greenium?, Rock Center for Corporate Governance at Stanford University Working Paper No. 239, Stanford University Graduate School of Business Research Paper No. 19-14, Journal of Accounting and Economics, Volume 69, Issues 2–3, April–May 2020, 101312, Available at SSRN: <https://ssrn.com/abstract=3333847> or <http://dx.doi.org/10.2139/ssrn.3333847>

¹⁴⁴ Gilotta, Sergio. Green Bonds and the EU Legal Framework: An Updated Overview.

¹⁴⁵ Bužinskė, Julija, and Jelena Stankevičienė. "Analysis of Success Factors, Benefits, and Challenges of Issuing Green Bonds in Lithuania." *Economies* 11, no. 5 (2023): 143. <https://doi.org/10.3390/economies11050143>.

for adopting rigorous reporting standards, enabling smaller issuers to meet these requirements without excessive financial strain.

This grey area can lead to inconsistencies in reporting and verification practices, hindering the integrity of the Green Bond market, leading to loss of trust, uncertainty on the allocation of funds and the genuineness of the character of the funded project and reputational risk for the issuer and the investor¹⁴⁶. Subsidies targeted at third-party verification processes or financial incentives for adherence to stringent standards can strengthen transparency while reducing the compliance burden for smaller issuers, thus preserving market credibility. Uniform standards, as those promoted by the Green Bond Principles (GBP), adherence to green bond frameworks and a comprehensive disclosure regarding project performance and environmental impact are essential to mitigate these risks, providing consistent frameworks for measurement of the impact of the project and verification. Lack of such standards and practices creates a market landscape characterized by increased regulatory scrutiny, misinformation and reduced accountability¹⁴⁷.

iii. Regulatory and Policy risks /Transition Risks

The constant movement of the economies towards low-carbon markets and sustainable practices leads to constant shifts in regulatory and policy frameworks, which can cause uncertainty for a potential investor requiring continuous monitoring from the point of the investor so as to always be prepared and updated¹⁴⁸. These changes can be surpassed through new business models, making the already existing models and technologies dated and affecting the long-term success of environmentally focused projects and the support of tax credits and subsidies for complying with the regulations, adopting new technologies, smoothing the transitions to different regulatory landscapes and ensuring the vitality of the Green Bond market and the underlying projects. In such cases the investors and the projects that fail to evolve and timely adjust their business model with the new frameworks and economy models will face financial losses from the Green Bond-funded projects¹⁴⁹. For instance, a sudden or retroactive regulatory change may put the investors at risk of financial losses due to unforeseen compliance costs or policy reversals.

Inconsistencies in governmental policies across member states in applying Green Bond standards, differences between jurisdictions and a lack of a uniformly cohesive regulatory framework create an uncertain and insecure market for potential investors that is not appealing. The potential of these shifts affecting the viability of an ongoing green project and its environmental and financial returns, or the classification of the green projects and their eligibility, rather alienates potential investors from the field of Green Bonds. Government-backed guarantees or risk-sharing mechanisms offered through

¹⁴⁶ Tripathy, Aneil. "Translating to Risk: The Legibility of Climate Change and Nature in the Green Bond Market." *Economic Anthropology* 4, no. 2 (2017): 239-250. <https://doi.org/10.1002/sea2.12091>.

¹⁴⁷ Also see Flammer, C. (2021). Corporate Green Bonds. *Journal of Financial Economics*, 142(2), 499-516. <https://www.sciencedirect.com/science/article/pii/S0304405X21000337>

¹⁴⁸ European Central Bank. Guide on Climate-Related and Environmental Risks. November 2020. Accessed October 30, 2024. <https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.202011finalguideonclimate-relatedandenvironmentalrisks~58213f6564.en.pdf>

¹⁴⁹ Gilotta, Sergio. "Green Bonds: A Legal and Economic Analysis." In *Research Handbook on Environmental, Social, and Corporate Governance*, edited by Thilo Kuntz. Forthcoming publication by Edward Elgar, April 2023. https://www.orizzontideldiritto.commerciale.it/wp-content/uploads/2023/05/Gilotta_Green-bonds_ODC-2023_UPDATED.pdf

public incentives can provide stability, encouraging participation even in unpredictable market conditions. Shifts in government support, for example, in renewable energy initiatives, can lead to fluctuations in demand for green bonds, impacting their pricing and liquidity.

iv. Market risks: Market Size and Liquidity Issues

The Green Bond market has experienced significant growth in the last few years but is still small in terms of size and liquidity compared to traditional bond markets. In a limited market size, buying and selling bonds can be challenging for the investor, as lower trading volumes could lead to price volatility and increased transaction costs compared to more liquid markets, such as those of traditional bonds. Trading Green Bonds can be harder and slower and be followed by price impacts, making the Green Bond market unattractive for investors as an asset class, as it is challenging to enter a small and concentrated market, limiting investors' ability to build well-diversified portfolios. Such limitations in mobilizing substantial capital towards sustainable projects will restrain the market growth to its limited size¹⁵⁰. Also, Green Bond issuance is concentrated in specific sectors, such as renewable energy, public transportation, or green infrastructure, enhancing concentration risks and liquidity risks and leading to volatility in pricing when the market conditions change¹⁵¹. Public law incentives, such as subsidies for first-time issuers or tax incentives for institutional investors, can help expand the market size by encouraging more issuers to enter and more investors to participate, thereby increasing liquidity.

Another significant market risk is that the demand for Green Bonds often outstrips the supply, creating a mismatch and leading to further liquidity issues. In simpler words, whilst the interest of potential investors has risen, the Green Bonds that are issued cannot keep pace with the augmented demand¹⁵². Such an imbalance can lead to the so-called "greenium"¹⁵³, meaning that Green Bonds are traded at a premium compared to traditional bonds due to perceived low risk and positive environmental impact¹⁵⁴. This phenomenon can benefit the issuer, but eventually it could reduce the yield for the investor, thus discouraging investors from investing in long-term projects. Additionally, changes in market models and market sentiment following the regulatory and policy shifts and the broader perception of sustainability risks impact the value of the Green Bond market. Government-backed incentive programs to support diversified issuance across different sectors and mechanisms for subsidized issuance costs can address this imbalance, fostering growth in Green Bond supply and market stability.

¹⁵⁰ Wulandari, Febi and Schaefer, Dorothea and Stephan, Andreas and Sun, Chen, Liquidity Risk and Yield Spreads of Green Bonds (March 12, 2018). DIW Berlin Discussion Paper No. 1728, Available at SSRN: <https://ssrn.com/abstract=3161323> or <http://dx.doi.org/10.2139/ssrn.3161323>

¹⁵¹ Suborna Barua, Micol Chiesa, Sustainable financing practices through green bonds: What affects the funding size? (April 01, 2019), Business Strategy and the environment, Available at <https://doi.org/10.1002/bse.2307>

¹⁵² Wulandari, Febi and Schaefer, Dorothea and Stephan, Andreas and Sun, Chen, Liquidity Risk and Yield Spreads of Green Bonds (March 12, 2018).

¹⁵³ The presence of a greenium suggests that some investors are willing to accept lower returns to support sustainable projects, but it can also be a deterrent for those seeking competitive market-based returns

¹⁵⁴ Gilotta, Sergio. "Green Bonds: A Legal and Economic Analysis."

v. *Environmental and Climate-Related Risks*

Environmental risks refer to the potential impact that climate change or other environmental factors may have on projects funded by Green Bonds. Climate-related risks and environmental risks can be physical or transitional (see iii. Regulatory and Policy risks/Transition Risks)¹⁵⁵. The physical risks can be climate related to extreme weather events and chronic weather patterns, which can lead to practical problems at the construction stage or the operational stage (e.g. damaging infrastructures, disrupting the operations), thus reducing the efficacy of the relevant projects. Chronic weather patterns, like droughts or flooding, can, for example, hinder agricultural initiatives, or prolonged periods of low sunlight would reduce the results of a solar energy project. Also, physical risks can be environmentally related, encompassing broader ecological and resource-related challenges, such as water stress, resource scarcity, biodiversity loss and pollution¹⁵⁶. Subsidies for resilient infrastructure or tax credits for adopting climate-adaptive technologies can mitigate these risks by reducing the financial impact of such disruptions and ensuring long-term project viability. For instance, in the case of scarcity of resources used in green technologies, the supply chain will be affected, making the project not feasible. These risks impact the financial performance and the viability of Green Bonds, affecting the financial returns of the project and the environmental effectiveness.

A noteworthy case study from the international landscape is the Belo Monte Hydroelectric Dam in Brazil¹⁵⁷, which, due to prolonged droughts reducing the water levels of the rivers that meet the Belo Monte Dam, dealt with difficulties, as the dam's capacity to generate electricity was reduced. Such an external factor, that in many cases cannot be predicted due to climate change results and the unpredictable character of several weather incidents, creates difficulties for Green Bond-funded projects meeting their expected outcomes and financial performance, highlighting the potential challenges of relying on climate-dependent renewable energy sources. Concessional financing or state guarantees for climate-resilient projects can help address such risks, ensuring that projects meet their environmental and financial objectives even under adverse conditions.

vi. *Environmental Effectiveness and Reputation Risk*

The ability of the Green Bond-funded projects to deliver the promised environmental outcomes is a crucial factor for the potential investors. Despite their goal of securing financial returns and performance, Green Bonds' primary goal is to meet environmental targets and fund projects that genuinely contribute to environmental sustainability efforts. A Green Bond will be deemed as effective and successful when the use of

¹⁵⁵ European Central Bank. Guide on Climate-Related and Environmental Risks. November 2020. Accessed October 30, 2024. <https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.202011finalguideonclimate-relatedandenvironmentalrisks~58213f6564.en.pdf>

¹⁵⁶ Also see: European Securities and Markets Authority (ESMA). Environmental Impact and Liquidity of Green Bonds. 2021. https://www.esma.europa.eu/sites/default/files/trv_2021_2environmental_impact_and_liquidity_of_green_bonds.pdf. and Bank for International Settlements (BIS). "Press Release: Central Banks and Supervisors Publish Open Letter on Climate-Related Financial Risks." April 30, 2020. Accessed October 30, 2024. <https://www.bis.org/press/p200430.htm>.

¹⁵⁷ The Belo Monte Dam is one of the world's largest hydroelectric dams, located on the Xingu River in the Amazon basin, Brazil, designed to produce up to 11,233 megawatts of electricity, contributing to the country's renewable energy capacity. For more information see Milhorance, Flávia. "Belo Monte Boondoggle: Brazil's Biggest, Costliest Dam May Be Unviable." Mongabay, January 17, 2020. <https://news.mongabay.com/2020/01/belo-monte-boondoggle-brazils-biggest-costliest-dam-may-be-unviable/>

proceeds has been genuine and the project has achieved substantial and positive environmental outcomes of reducing greenhouse gas (GHG) emissions, enhancing biodiversity, promoting sustainable use of resources, or any other target it aimed at. If the project fails to meet the expected outcomes, the investors will face risks in terms of financial performance and reputation, which could undermine their credibility and the credibility of the Green Bond market as a whole¹⁵⁸. Public law incentives, such as grants for third-party verification of environmental outcomes or subsidies for rigorous impact monitoring, can strengthen accountability, ensuring projects meet their stated objectives and maintaining investor trust. As investors integrate more and more the ESG criteria into their assessments and decision-making processes, the financial aspects of the projects and the expected yields intertwine with alignment of environmental targets that are economically viable and socially and ethically engrossing¹⁵⁹.

When the Green Bond-funded project that the investor financed and supported fails, the investor faces the reputational risk of being accused of greenwashing¹⁶⁰. Especially when a project fails to offer positive environmental impact, comply with sustainability standards, or present adverse social or ecological effects, the investor loses their credibility and trust from stakeholders and the respective government and will have to deal with potential social outcry, facing the potential of inability in the future to gather capital for green or other initiatives.

Despite the climate-related and environmental risks that we have already mentioned as potential issues on the effectiveness of the project, parameters such as the implementation of the projects, the assessment, monitoring and the general design will affect the financial and environmental outcomes of the project¹⁶¹, while the lack of standardized metrics for measuring the environmental performance of the project creates difficulties in assessing the effectiveness and can lead to very different results from those that the investor was expecting when firstly examined the project¹⁶². The uncertainty of those risks may deter the potential investor who is actually concerned about the actual environmental impact and the achievement of environmental sustainability. Incentivizing compliance with high environmental standards through tax benefits or direct financial support for compliance activities can help mitigate these risks, safeguarding the credibility of the Green Bond market.

Using the previous case study, the Belo Monte Dam in Brazil is a perfect example of how a lack of risk assessment and well-structured strategies on implementation can have adverse results on the environment. While its target was to reduce GHG emissions via hydrogenated power, it had significant environmental and social impact, as it was criticized for extensive deforestation of the Amazonian forest, flooding of vast landscapes, harm of the aquatic ecosystems and the disruption of the indigenous

¹⁵⁸ Tripathy, Aneil. "Translating to Risk: The Legibility of Climate Change and Nature in the Green Bond Market." *Economic Anthropology* 4, no. 2 (2017): 239-250. <https://doi.org/10.1002/sea2.12091>.

¹⁵⁹ Mertzanis, Charilaos, and Imen Tebourbi. "Geopolitical Risk and Global Green Bond Market Growth." March 25, 2024. <https://doi.org/10.1111/eufm.12484>.

¹⁶⁰ Also see Laine, Jari. "Social and Environmental Risks in the Global Value Chains and the Role of Sustainability Reporting." *SSRN Electronic Journal*, 2018. <https://doi.org/10.2139/ssrn.3161323>.

¹⁶¹ Also see Bužinskė, Julija, and Jelena Stankevičienė. "Analysis of Success Factors, Benefits, and Challenges of Issuing Green Bonds in Lithuania." *Economies* 11, no. 5 (2023): 143. <https://doi.org/10.3390/economies11050143>.

¹⁶² Also see Laine, Jari. "Social and Environmental Risks in the Global Value Chains and the Role of Sustainability Reporting." *SSRN Electronic Journal*, 2018. <https://doi.org/10.2139/ssrn.3161323>.

peoples of the forest¹⁶³, bringing the projects face to face with accusations of greenwashing and reputational risks.

vii. Greenwashing Risks

As we have already mentioned, the term greenwashing refers to the practice of making false, exaggerating or misleading claims about a project or investment having environmental benefits, such as using vague, exaggerated, or deceptive terms like "eco-friendly" or "safe for the environment" in order to win over the consumers or investors who are concerned about environmental issues through deceptive marketing tactics and attract capital without genuinely delivering the expected environmental outcome¹⁶⁴. Lack of universal definitions on what can bear the label of a "green" project and can be subject of a Green Bond, criteria and standards leaves spaces for malicious issuers to present environmental benefits that are far from reality. Public law incentives can play a role in combating greenwashing by providing financial support for adherence to internationally recognized standards, such as the Green Bond Principles (GBP) or the EU Green Bond Standard, ensuring issuers meet stringent criteria for transparency and accountability. Greenwashing poses a serious risk as it can lead to reputational damage and affect the credibility and integrity of the project and the issuer¹⁶⁵. By managing the perception of "greenness" and ensuring transparency, accountability and clear criteria and standards, the risk of greenwashing can be mitigated, and the funds will be allocated to projects with true environmental incentives, offering market confidence and integrity¹⁶⁶.

A notable case study of greenwashing is Repsol Green Bond (2017) of €500 million issued by an oil and gas company in Spain with the objective of improving the efficacy of the existing fossil fuel operations. The Green Bond faced criticism as, while adhering to the Green Bond Principles, it would be used for the amelioration of fossil fuel operations, which are completely opposite to the broader EU goals and character of Green Bonds, of reducing GHG emissions and transitioning to RE sources. This case study shows that while there were standards in place, a lack of strict criteria and clear definitions led to manipulating the Green Bond market into funding a project inherently opposite to the initiatives and aspirations of the Green Bond market¹⁶⁷. Public law incentives tied to strict compliance and monitoring requirements can help prevent such misuse, ensuring that Green Bonds fund genuinely sustainable projects and reinforcing market integrity.

¹⁶³ Fearnside, Philip M. "Brazil's Belo Monte Dam: Greenwashing Contested." Mongabay, February 1, 2021. <https://news.mongabay.com/2021/02/brazils-belo-monte-dam-greenwashing-contested-commentary/>.

¹⁶⁴ Also see Bužinské, Julija, and Jelena Stankevičienė. "Analysis of Success Factors, Benefits, and Challenges of Issuing Green Bonds in Lithuania." *Economies* 11, no. 5 (2023): 143. <https://doi.org/10.3390/economies11050143>.

¹⁶⁵ Shi, Xianwang, Jianteng Ma, Anxuan Jiang, Shuang Wei, and Leilei Yue. "Green Bonds: Green Investments or Greenwashing?" *International Review of Financial Analysis* 90 (2023): 102850. <https://doi.org/10.1016/j.irfa.2023.102850>.

¹⁶⁶ Also see Baker McKenzie. *Green Bonds: A Practical Overview*. September 2019. Accessed October 30, 2024. <https://www.bakermckenzie.com/-/media/files/insight/publications/2019/09/iflr--green-bonds-%28002%29.pdf>.

¹⁶⁷ Climate Bonds Initiative. "The Oil & Gas Bond We Knew Would Come Eventually: Repsol Good for the GBPs, but Not So Sure About the Green Credentials." May 2017. Accessed October 30, 2024. <https://www.climatebonds.net/2017/05/oil-gas-bond-we-knew-would-come-eventually-repsol-good-gbps-not-so-sure-green-credentials>.

2. Impact of Public Law Incentives on Investor Confidence

i. Benefits of Public Law Incentives for Investor Confidence

Public law incentives, such as tax credits, subsidies and regulatory support, constitute an important tool utilized by states and governments in order to encourage investors to move their interest towards investing in Green Bonds and other environmentally focused financial instruments. While these incentives can lead to beneficial results in the investors' confidence and trust, as they create a market landscape with low risk, economic advantages and governmental commitment to sustainability targets, they may also function as a stumbling block due to potential risks and limitations that are ancillary.

The reduction of risks associated with long-term, capital-intensive green projects, such as renewable energy initiatives, infrastructure development, and other sustainability-focused projects that often come with high initial costs and extended payback periods, via guarantees and concessional financing, can reassure the potential investors of the viability of the investment¹⁶⁸. Mitigating the financial risk and providing predictable and stable incentives can encourage a wider range of investors to enter the Green Bond market, from insurance companies to retail investors and showcase the governmental commitment to supporting green finance. Besides the reduction of the financial risk, these incentives can also improve the actual financial returns of a Green Bond, as they create a monetary advantage for investors, making green bonds more competitive and attractive than traditional bonds¹⁶⁹.

Another essential public law incentive that can be beneficial for the investor's confidence is a clear and expected regulatory and policy framework, such as the ones provided by the European Union's Taxonomy for Sustainable Activities and the EU Green Bond Standard, providing specific definitions and criteria, reporting mechanisms and security against risks like greenwashing.

ii. Risks of Public Law Incentives

On the other hand, temporary or inconsistent public law incentives that are constantly shifting across jurisdictions can create an environment of uncertainties and the investors may perceive the Green Bond market as risky and unpredictable¹⁷⁰, thus hesitating to invest in long-term projects in such a risky market segment. A stable and clear regulatory context also depicts how strong the governmental commitment to environmental goals and decarbonization is, which creates a favorable climate for the investor. Constant policy changes from the government give the impression that the state does not truly care about the achievement of environmental targets and may undermine investors' confidence due to policy inconsistency and unpredictability.

¹⁶⁸ See also, World Bank. "Catalyzing Private Investments and Climate Finance to Turn Energy Transition Ambitions to Reality." August 4, 2023. Retrieved from <https://www.worldbank.org/en/results/2023/08/04/catalyzing-private-investments-and-climate-finance-to-turn-energy-transition-ambitions-to-reality>

¹⁶⁹ Also see Bank of Greece. The Economic and Financial Effects of Climate Change: Insights from a Dynamic General Equilibrium Model with Environmental Externalities. Athens: Bank of Greece, 2019. <https://www.bankofgreece.gr/Publications/Paper2019258.pdf>

¹⁷⁰ European Parliament and Council. 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. December 11, 2018. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018L2001>.

Another factor influencing investor confidence is the level of transparency of the Green Bond market, of standards of reporting and accountability. A market with a high level of transparency and control, where the use of proceeds is met and used as intended to generate verifiable environmental outcomes and the allocation of public law incentives is done inefficiently, damages investors' confidence as it increases risks of greenwashing and gives the impression of an uncredible and untrustworthy market. Therefore, well-structured and strict Reporting, Monitoring and Verifying (MRV) frameworks¹⁷¹ and accountability measures, such as third-party verification and regular impact assessments, can maintain market integrity and enhance transparency.

3. Limitations of Public Law Incentives

The establishment of an open internal market, in which economic operators develop their activity freely, has been a goal of the European Union throughout the years. Moreover, it is common knowledge that the reduction of barriers and the unhindered entry of new economic actors into the market allows the development of healthy competition between both European and foreign companies. State aid can be an effective means of attracting foreign investment and developing the state economy by encouraging competition. However, public law incentives carry serious risks as they may distort the internal market. It is likely that the excessively favorable treatment of foreign economic operators will discourage European companies, which will be in a more unfavorable position compared to third country companies and will ultimately become a suppressor in the development of economic action by them. In other words, state aid, if given without restrictions, may subvert meritocracy and equal business competition, because domestic firms will be unable to survive, and much less compete with powerful foreign investors.

Taking the above concerns into account, the EU attempted to develop a system of control of public law incentives in order to allow the entry of foreign economic operators into the internal market while ensuring the existence of fair conditions for all companies that develop economic activity¹⁷². Nevertheless, EU's legislative bodies failed to develop a cohesive regulatory framework under which member states would harmonize their practices in the provision of public law incentives and adopted sporadic and overlapping provisions instead. The result of this was the creation of an extremely complex and complicated legal framework for public law incentives, which significantly limited the ability of member states to grant privileges to attract foreign investment.

It is recalled that, in principle, the state aid regime is governed by Articles 107 and 108 of the Treaty on the Functioning of the European Union (TFEU). According to the provisions of these articles, state aid is permissible as long as it does not distort or threaten to distort competition and is not incompatible with the internal market, i.e. it does not affect economic relations between member states.

Furthermore, the Commission is empowered to review the public law incentive schemes of the member states and to request the abolition of state aid that it deems incompatible with the internal market, giving it the possibility to appeal to the Court of Justice of the

¹⁷¹ Climate Policy Initiative. MRV System Design Recommendations for Green Bonds in China. Climate Policy Initiative, 2020. <https://climatepolicyinitiative.org/wp-content/uploads/2020/06/MRV-System-Design-Recommendations-for-Green-Bonds-in-China.pdf>.

¹⁷² Schonberg, Maximilian. "The EU Foreign Subsidies Regulation: Substantive Assessment Issues and Open Questions." *European State Aid Law Quarterly* 21 (2022): 143.

European Union in the event of non-compliance of the member state. Therefore, the public law incentives granted by the member states must be harmonized with the competition principles of the Union, while it is possible that their granting requires the relevant approval of the European Commission¹⁷³. Undeniably, the Commission's supervision acts as a safety net, guaranteeing the prevention of unfair practices of the past, such as the granting of excessive advantages to specific foreign economic operators, which circumvented competition and harmed the EU economy and production. At the same time, however, it introduces rigidities, which are not consistent with the conditions and fast pace of modern trade, while often hindering the free entry of third-country companies into the internal market of the Union, providing an insurmountable advantage to the companies of the member states.

The Foreign Subsidy Regulation (FSR) has recently been added to the already complex state aid regulatory framework of the European Union, introducing a number of new restrictions, especially on foreign investment in cross-border projects. The FSR seeks to put a definitive end to subsidies that distort internal market conditions, sets out a stricter framework for State aid control, introducing a series of new indicators that the Commission must consider when examining public law incentive schemes of the member states. More specifically, it is stipulated that the Commission must take into account additional factors, such as the size of the incentive provided in absolute terms, as well as in relation to the size of the market and the value of the investment¹⁷⁴. At the same time, it is necessary to examine the characteristics of the market of the individual member states, in order to establish the alignment of the aids both with the competition principles of the Union and with the market conditions of the member state. Thus, the provision of facilities to foreign investment, which concerns sectors that show satisfactory or excess production capacity due to the activity of domestic enterprises, should be prevented because they may cause distortions.

The Foreign Subsidy Regulation marks a new era for state investment, characterized on the one hand by greater protection of the interests of domestic economic operators, and on the other hand by the sluggishness of state economies in the absence of foreign investment. The FSR Regulation provides numerous conditions for the provision of public law incentives to companies that are going to be active in large-scale projects, making it practically impossible. For this reason, uncertainty is increasing for multinational projects, as the provision of additional control mechanisms makes it difficult to provide state aid and limits the interest of foreign investors. After all, the strict provisions of the FSR combined with the fiscal discipline required by the Stability and Growth Pact (SGP) framework limit the ability of member states to finance expansive or innovative stimulus programs, especially when it comes to states with high debt ratios.

In addition, the provision of public law incentives is hindered due to the legal and administrative burdens caused by multiplicity with the existence of numerous provisions scattered in individual legal texts, which in many cases overlap and are applied simultaneously. In other words, the provisions of the national legal order of the respective member state, the Union provisions on state aid and the FSR, as well as the rules of

¹⁷³ Baumann, Philipp. "The EU Foreign Subsidies Regulation: The Final Piece of the Regulatory Puzzle to Ensure Competitive Neutrality in Cross-Border M&A?" In *Weaponising Investments*, 199–218. Cham: Springer, 2023.

¹⁷⁴ Hornkohl, Lars. "The EU Foreign Subsidy Regulation: Why, What and How?" In *Weaponising Investments: Volume II*, 1–39. Cham: Springer Nature Switzerland, 2023.

international trade in the framework of the WTO, should be taken into account when planning state aid. The requirement to comply with the individual regulatory frameworks and the constant legislative changes and amendments result in rapidly increasing the time and costs required for the provision and granting of public law incentives. By extension, there are increased delays in project approvals, which negates the purpose of state aid by reducing the interest of foreign companies to operate in the internal market of the Union¹⁷⁵.

It is obvious that all the factors analyzed above significantly limit the effectiveness of public law incentives in the European Union. The establishment of strong supervision mechanisms and strict conditions for the provision of state aid ensures to a significant extent transparency and meritocracy both in the actual provision and use of subsidies and in the equal competition of domestic and foreign enterprises in the market. However, it multiplies the financial and administrative costs of planning state aid, while it sets barriers to the operation of foreign-funded enterprises in the internal market. At the same time, it should not be overlooked that the adoption of a complex regulatory framework creates increased risks for circumvention of legislation and/or fraud, especially in cases where investments concern large projects with many stakeholders. These challenges highlight the need for a more streamlined and adaptive regulatory approach that balances environmental objectives, economic competitiveness and regional needs, ensuring that incentives effectively support the EU's broader sustainability and economic objectives.

4. Effectiveness of Tax Incentives and Subsidies

Public law incentives, such as tax credits, subsidies and regulatory support, have been widely used by stakeholders (governments and states) in order to attract more investors in the Green Bond market, as they aim at reducing the cost of the Green Bond, improving the viability and controlling the risks that accompany it. The target is to create a market that is appealing to potential investors, thus stimulating the demand for the Green Bond market and increasing market confidence. Their effectiveness can be based on their ability to provide precise targeting, policy consistency and balance between public support and market independence.

As already mentioned, tax incentives and subsidies manage to directly reduce the financial costs of Green Bonds for the investor and the issuer by improving the financial conditions, providing tax exemptions, or ameliorating the feasibility of underlying projects. Especially subsidies directly solve the issue of the high upfront costs of Green Bond-funded projects, which usually accommodate large-scale renewable energy initiatives, such as offshore wind farms or solar parks, making them a viable choice for the potential investor¹⁷⁶. If these public law incentives are allocated inefficiently or misused, they can hinder progress towards the environmental target and distort the market's competition by emphasizing large-scale beneficiaries (corporations or projects) with limited environmental impact, leaving smaller, community-driven, local initiatives

¹⁷⁵ Frank, M. (2023). The EU's new Foreign Subsidy Regulation on collision course with the WTO. *Common Market Law Review*, 60(4).

¹⁷⁶ Climate Bonds Initiative. *Green Bond Public Sector Guide: How to Issue Sovereign Green Bonds*. Climate Bonds Initiative, 2017. P. 23 - 28 https://www.climatebonds.net/files/files/GB-Public_Sector_Guide-Final-1A.pdf.

that are more impactful without adequate support on the sidelines¹⁷⁷. Under some circumstances, the misallocation of public law incentives can be followed by significant allegations of greenwashing, especially if the project does not have impactful results for the environment or has negative results for the local communities¹⁷⁸.

Another barrier in the effectiveness of tax incentives and subsidies in the Green Bond market is the administrative complexity, with a rambling set of stringent compliance requirements, such as detailed reporting and eligibility criteria, which, of course, are costly and time-consuming for the investor. This complexity, in addition to policy inconsistencies in a specific jurisdiction and the fact that the Green Bond market is characterized by fragmentation of the market and lack of harmonization across jurisdictions, can reduce market liquidity, increase transaction costs and also limit the accessibility of smaller investors in this market segment.

On a final note, expanded policies of providing these kinds of public law incentives can create over-reliance on public incentives, creating completely dependent investors with projects that are not viable without the subsidies and cannot be sustainable in the Green Bond market. Miscellaneous actors may also benefit from such subsidies and their intrinsic economic and environmental value without actual interest in environmental achievements, leading to distortion of the Green Bond market.

5. *Barriers to the Implementation of Public Law Incentives*

The growth of Green Bond market depends on supportive policies, regulatory frameworks and market conditions like interest rates and credit cycles. Emerging economies face unique barriers, such as a lack of domestic debt markets, varying significantly across jurisdictions.

In many jurisdictions, a major obstacle is the lack of awareness and understanding of the Green Bonds, as policymakers, regulators, issuers, and investors are unfamiliar with the benefits, financial and environmental, of Green Bonds in their economies or the basic guidelines, like those established by the Green Bond Principles (GBP) and Climate Bonds Initiative (CBI). In these intricate guidelines, many stakeholders hesitate to engage in the Green Bond market as they are uncertain of the unknown. Of course, the hesitation of new potential participants to enter the Green Bond market can only limit the expansion of this market segment. Multilateral development banks (MDBs) and supranational organizations, via programs and campaigns, promote Green Bond adoption, trying to ameliorate the understanding among stakeholders and raise awareness for this emerging market segment that can help industries meet ESG principles and governments meet their NDCs¹⁷⁹.

Another issue that may challenge the implementation of these incentives is that, besides the need for a harmonized regulatory environment, many countries may require more

¹⁷⁷ Tsegay, B. Green Economy for Climate Change Mitigation and Poverty Reduction in Sub-Saharan Africa: A Critical Analysis of Carbon Finance in Ethiopia. SOAS University of London, 2020. https://eprints.soas.ac.uk/41212/1/Tsegay_2020.pdf.

¹⁷⁸ Fearnside, Philip M. "Brazil's Belo Monte Dam: Greenwashing Contested." Mongabay, February 1, 2021. <https://news.mongabay.com/2021/02/brazils-belo-monte-dam-greenwashing-contested-commentary/>.

¹⁷⁹ OECD (2017), "Barriers, policy actions and options for green bond market development and growth", in Mobilising Bond Markets for a Low-Carbon Transition, OECD Publishing, Paris. DOI: <https://doi.org/10.1787/9789264272323-5-en>

tailored definitions and guidelines that align with their specific goals, especially those that deal with more localized and unique environmental priorities like air and water pollution. A strong -non-EU- example is China, which deals with severe air pollution and needs to prioritize air quality improvement, necessitating guidelines that go beyond global standards. The same need for clearer, localized and custom-made frameworks exists also for countries with limited access to international capital and reliance on domestic markets. Of course, this much-needed differentiation must not be characterized by a lack of coordination between local and national governments, as it would create further inconsistencies that confuse issuers and investors, undermining market efficiency and creating market fragmentation¹⁸⁰.

A substantial barrier is the transition, issuance and compliance costs that accompany the Green Bond market, which constitutes a practical problem, especially for smaller actors. If we consider that only the verification processes for green bonds, which include obtaining second-party opinions or third-party assurances, can range from \$10,000 to \$100,000, it can be easily understandable that such expenses and any additional financial burdens will discourage smaller players from participating in this market segment. Another issue may be bureaucratic delays, resistance to change, or a preference for maintaining the status quo. Thus, institutional inertia that characterizes the regulatory bodies and government agencies may be slow to adopt innovative policies or frameworks as they tend to resist change and stick to established practices¹⁸¹.

C. Role of Public-Private Partnerships (PPPs) in Green Bond Investments in Renewable Energy

The contemporary landscape of the financial market creates the perfect ground for renewable-energy infrastructure projects based on Green Bond financing. This has become apparent. According to Global capital companies on a worldwide scale are expected to make pioneering issuances, especially around emerging countries. To be more precise, institutions related to renewable energy investment are becoming more and more concerned regarding the allocation of their funds. This is happening due to stricter requirements and regulatory measures like the leverage ratio in the Basel III¹⁸² framework, restricting excessive debt exposure. The key aim of Public-Private Partnerships - PPPs, blending public sector support and private sector expertise and resources, is to regulate investing funds, especially those that are given for the implementation of new technologies with unproven environmental and financial outcomes¹⁸³.

A noteworthy case of such a PPP is the Climate Bonds Initiative (CBI) itself. CBI has introduced new international standards, used as a benchmark for the recognition and acceptance of new projects regarding renewable energy infrastructure. The methodology

¹⁸⁰ Emodi, N. V., Wade, B., Rekker, S., & Greig, C. (2022). *A systematic review of barriers to greenfield investment in decarbonisation solutions*. Renewable and Sustainable Energy Reviews, Elsevier. <https://www.sciencedirect.com/science/article/pii/S1364032122004828#sec5>

¹⁸¹ Ibid.

¹⁸² Also see Basel Committee on Banking Supervision. *Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems*. Bank for International Settlements, 2011. Accessed November 18, 2024. <https://www.bis.org/publ/bcbs189.htm>.

¹⁸³ World Bank Group. *Public-Private Partnership Reference Guide, Version 3*. Washington, D.C.: World Bank, 2024. <https://ppp.worldbank.org/public-private-partnership/sites/default/files/2024-08/PPP%20Reference%20Guide%20Version%203.pdf>.

is built on clearly defined solar, wind, green building and transport thresholds. It also establishes methodologies for efficiently measuring the results achieved from their implementation.

Only after a project has been certified as green by the standards set by the CBI or other PPPs, can the Bonds of the investing companies be labeled as Green Bonds. PPPs such as the CBI and frameworks like ESG become a safety threshold on both financial and environmental level, providing strict measures and benchmarks for any project that regards renewable energy infrastructure.

Those safety thresholds set by the PPPs will in their turn improve investing activities. The clearly defined standards will attract more investment in green activities, since the procedure is indeed safer. PPPs have become an essential asset that has driven an increase of green funds regarding renewable energy infrastructure projects, and an awareness in the investing industry, of the benefits of green bonds and funds.

Through PPPs, emphasis is placed on services traditionally provided by the government and transferred to the private sector in the field of economic or social infrastructure regarding renewable energy sources and environmental protection. By addressing environmental concerns, as well as social and financial ones of the people living in areas that can be used for renewable energy infrastructure, PPPs ensure that any project will improve the wellbeing of the community involved¹⁸⁴. An example of how PPPs improve communities are the initiatives in Astana¹⁸⁵, Birmingham¹⁸⁶, Nokia, and Lyon. The said initiatives demonstrated how innovative partnerships, even on a local scale, can lead to sustainable production, as well as consumption behavior that is friendly to the environment.

The cornerstone of the success of renewable energy PPPs is that they align the interests and expectations of the public and private partners, conduct a thorough feasibility study and risk assessment, and designed with a clear and fair legal and regulatory framework. Renewable energy PPPs are not without barriers and challenges¹⁸⁷. The right balance between the responsibilities of the public and the private sector is on all accounts something hard to find. This may lead to difficulties regarding adequate and timely financing of projects, or even disagreements on a technical and operational level.

Through PPPs, governments are enabled to undertake renewable infrastructure projects with minimal public expenditure. By sharing the risks with private partners, governments can benefit from private sector expertise and capital to bridge gaps in public sector capacity and funding. Additionally, the careful and critical regulation of the

¹⁸⁴ Steedman, T. L., Del Percio, S., and Kimball, M. L. "The Greening of Public-Private Partnerships: What Design Professionals and Contractors Need to Know for Green Building's Next Legal Frontier." *University of Baltimore Journal of Land and Development* 3, no. 2 (2014): 1.

¹⁸⁵ In Astana, the Nur Alem project, a collaboration within the framework of Expo 2017, served as a platform for education and public awareness, drawing international attention to the feasibility of renewable energy projects smart city innovations. See Kenes, K., et al. (2018). "Renewable Energy Projects in Astana's Nur Alem Framework.

¹⁸⁶ Birmingham utilized a PPP model to retrofit municipal buildings with energy-efficient technologies, reducing energy consumption and operational costs. This project demonstrated the city's commitment to sustainability and environmental responsibility. See Lee, S.E., Braithwaite, P., & Leach, J.M. (2016). "Energy Systems in Birmingham: Retrofitting Success Stories." <https://www.sciencedirect.com/science/article/pii/S1364032116303525>

¹⁸⁷ Ryan, B. (2004). Public private partnerships and sustainability principles guiding legislation and current practice, Technological University, Dublin, Ireland. <https://arrow.tudublin.ie/cgi/viewcontent.cgi?article=1007&context=futuresacrep>

quantification, and scenario planning of potential risks, ensures that funds are managed in the most effective manner, and that the most capable party will undertake the project

The safe environment created by the PPPs, and the strict benchmarks and thresholds that are set, are only expected to further increase renewable energy and green funding. By being flexible, thorough and secure, PPPs ensure the best possible outcome for all not only the investors, but also the people and the environment itself.

Conclusions

The focal objective of this thesis was to undertake a detailed comparative analysis of the pivotal role of public law incentives in fostering the growth of green bond investments within the European Union, focusing on their impact on the broader goal of transitioning to a low-carbon economy, with a main focus on their effectiveness, legal background, and market impact. The study aimed, by employing an interdisciplinary approach, to discern the key features, merits, and limitations inherent to public law incentives and highlight their indispensable role in shaping a transparent and stable Green Bond market.

Public law incentives such as tax credits, subsidies and loan guarantees play a pivotal role in reducing the financial barriers and long-term market risks and mitigating investment risks that accompany the Green Bond market via creating a favorable regulatory environment that enhances market transparency, investor confidence and enables financial mechanism that specifically fund green projects. For the same reason, the EU has established a broad regulatory framework consisting of legally binding and non-binding regulations and standards that provide reporting systems and compliance requirements, thus ensuring the just and transparent use of proceeds, ensuring that funds are directed toward genuinely sustainable initiatives and shielding the Green Bond market from the risk of greenwashing.

Furthermore, the thesis endeavored to juxtapose that, nevertheless, public law incentives are not without risks, limitations and challenges that are generated from their own design and implementation. Regulatory uncertainties, a high level of complexity of compliance with the stringent criteria under the EU Taxonomy, need for substantial upfront capital undermine investors' confidence as they can exclude smaller issuers and innovative technologies, restricting market accessibility. EU frameworks, such as the state aid regime and the Foreign Subsidies Regulation, are key components in preventing market distortions and ensuring fair competition but also create constraints for public law incentives as they can limit the flexibility of financial support for green bond issuers, creating administrative burdens and delays, highlighting the need for incentives that is characterized by equitable and inclusive allocation mechanisms. The interplay between public and private mechanisms like public-private partnerships (PPPs), blended finance, and green securitization are also underscored in complementing public law incentives. These incentives play a crucial role as they manage to mobilize capital for Green Bond initiatives and mitigate risks, especially for large-scale green projects, such as renewable energy infrastructures that demand a high upfront cost but are absolutely crucial for the EU's green transition.

In order to surpass the limitations and barriers, there is a need for harmonizing policies and frameworks of different jurisdictions, which will enable cross-border investments, always respecting regional needs. The simplification of administrative procedures, the mitigation of transitioning and procedural costs and the amelioration of monitoring mechanisms can be achieved via digital innovations, such as blockchain, that can reduce costs and improve accessibility for smaller issuers, reinforcing the growth of the Green Bond market.

As the EU continues to lead in green finance, the study aimed to offer insights into the refinement and optimization of public law incentives and highlight the need for potential harmonization of the fragmented Green Bond market in order to ensure that this market

segment drives meaningful progress toward climate neutrality. On a final note, through this study, the researcher hopes to make a contribution to the field of climate policy and climate change mitigation by providing a deeper understanding of how strategic policy frameworks and well-structured incentives can catalyze sustainable finance while addressing the challenges that hinder its full potential, thus placing one very small stone in the struggle for a better, greener, healthier future for all the following generations of our Earth.

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