ROLE OF POLICY AND REGULATION IN ENHANCING GREEN FINANCE FOR ECOLOGICAL PROBLEM MITIGATION

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Abstract
The increasing urgency of environmental challenges relating to climate change and biodiversity loss calls for immediate actions to mitigate risks and impacts and requires innovative methods for funding sustainable solutions. One of the solutions is green finance, which refers to financing and investments that support environmentally sustainable projects and initiatives. Although there is increasing interest and investment in green finance, it is a financial instrument whose effectiveness is dependent on regulatory efficiency. Well-designed and structured policy framework may provide important incentives for wider green finance use, increase transparency and reporting, simultaneously aligning investment and money flows with environmental goals. The study aims to explore the role of policy and regulation in promoting green finance and addressing ecological issues. The research employs a literature review, Pearson correlation analysis, descriptive statistical methods and data visualisation. The authors analysed international policies comprised of the EU Taxonomy for Sustainable Activities, the Paris Agreement, and the European Green Deal, concluding that they serve as benchmarks for linking financial flows with ecological objectives while encouraging innovation, accountability and transparency. The green bond market in the EU has grown significantly, which was influenced by policy implementation that increased issuers and investor confidence. By providing incentives for sustainable investments, ensuring transparency and addressing systemic problems, the study emphasizes the critical role that policy and regulation serve in fostering a favourable financial environment.
Keywords: green finance, policy and regulation, ecological problems.

Introduction
The escalating global environmental crisis, characterized by climate change, biodiversity loss and ecosystem degradation, has underlined the need for innovative financial mechanisms to support sustainable development. In this context, green finance has emerged as a critical tool for allocating funds to organizations and projects that promote environmental sustainability. Previous research has primarily focused on broad international agreements, for example, the Paris Agreement or the implementation of green finance policies within specific countries. Studies have also examined how national policies influence industry or company ability to utilize green finance. For example, Odugbesan et al. (2021) analysed the impact of financial regulations on green finance in Turkey. Despite extensive research on both international policies and green finance mechanisms, a gap remains in understanding how different policies influence each other and the development of green finance markets.

The research aim is to explore the role of policy and regulation in promoting green finance and addressing ecological issues. To reach the research aim, the following tasks are advanced: 1) to analyse international frameworks supporting green finance; 2) to examine the relationship between green finance and ecological problem mitigation.

Materials and Methods
In this study, the authors used a literature review to conduct a comprehensive review of academic articles, policy documents and reports to identify global trends, challenges and the best practices in green finance regulation. A Pearson correlation analysis was employed to examine the relationship between net emissions and the amount of green bonds. Descriptive statistical methods and data visualization methods were used as well. Information was collected from secondary sources, including government publications, reports and research articles. The study period (2014–2023) was chosen to align with major policy developments, including the adoption of the Paris Agreement (2015), the European Green Deal (2019) and the EU Taxonomy for Sustainable Activities (2020). Data were sourced from government reports, open-access databases and climate finance research institutions.

Results and Discussion
International frameworks supporting green finance
The effectiveness of green finance and subsequently ecological problem mitigation is dependent on the policies. They strengthen credibility while simultaneously providing incentives for green finance growth. According to Shen, Ma & Chen (2024), the policies benefit the environment by improving regional ecological conditions and promoting sustainable development. The EU Green Deal, the Paris Agreement and the EU Taxonomy for Sustainable Activities are the three most significant international policy documents in shaping the regulatory landscape for green finance and advancing efforts to mitigate ecological challenges.

The United Nations (2015) Paris Agreement is a legally binding treaty to battle climate change with the main goal of ensuring that the rise in average temperature is significantly less than 2 °C. It introduced many solutions that help fight climate change:
• set a legally binding commitment and created a global roadmap for countries to integrate climate goals into economic planning (Falkner, 2016);
• provided long-term policy certainty, increasing investor confidence in green bonds and sustainable finance instruments;

• promoted carbon pricing mechanisms that led to the expansion of the EU Emissions Trading System (Boyce, 2018).

While the Paris Agreement is an important step towards battling climate change, many debate its effectiveness. Van Asselt & Kulovesi (2017) argue that it lacks sufficient enforcement mechanisms and raises concerns about member countries ability to meet their commitments. Similarly, Liu & Raftery (2021) express concerns about the slow pace of implementation and the considerable challenge of aligning with different national interests. Despite these criticisms, other experts believe the Paris Agreement's flexibility is a strategic benefit. Falkner (2016) suggests that this 'lack of enforcement mechanisms' gives countries the freedom to tailor their policies to their national circumstances. It could lead to stronger long-term outcomes compared to strict enforcement. One of the most significant contributions of the Paris Agreement is its influence on global financial markets. Article 2.1.c encourages aligning financial flows with low-emission development and upon implementation changed investment patterns. For example, based on Statista (2024), the value of green bonds worldwide in 2014, the year before the Paris Agreement, was USD 37.1 billion. By 2023 the value had grown to USD 587.6 billion – the market experienced an approximate fifteen-fold increase. These data show that the policy significantly influences green finance markets, which in turn mitigate ecological problems. Based on Climate Bonds Initiative (2024) data, the biggest investments from 2014 to 2023 were in energy with 35%, 25% in buildings and 19% in transport.

The Paris Agreement represents a landmark global effort to address climate change, setting ambitious targets to limit global warming and encourage nations to transition toward low-carbon economies. However, because of the freedom to tailor the policies, there needs to be concrete and actionable strategies at regional and national levels. In response, the European Union has taken a bold step forward with the European Green Deal (EGD). It was introduced in 2019 with the aim to transform the EU into the first climate-neutral economy by 2050, with a 55% reduction in greenhouse gas emissions by 2030 compared to 1990 levels (European Commission, 2024). The EDG is not only a climate strategy but also an economic transformation agenda. It integrates principles of green growth theory, which suggests that sustainable economic expansion is possible by utilizing innovation, regulatory frameworks and market-based mechanisms (OECD, 2011). It has had a major impact on green finance by establishing a strong regulatory framework that directs funds into environmentally friendly endeavours. Dombrovskis (2021) indicate that key initiatives like the EU Taxonomy for Sustainable Activities provide a science-based classification system to identify environmentally sustainable investments, while the Sustainable Finance Disclosure Regulation enhances transparency, helping investors make informed decisions. While the EGD sets an ambitious vision for a sustainable and climate-neutral Europe by 2050, its implementation remains a challenge. Eckert & Kovalevska (2021) express concerns about the adequacy of financial resources allocated to support the transition and the feasibility of achieving the ambitious targets within the proposed timelines. Andersson et al. (2025) from the European Central Bank confirm those concerns, for example, in 2023 5.1% of EU's GDP was invested towards emission reduction but based on estimates to reach the EGD goal, the number should be about 8.3% each year until 2030. They also highlight the need for private sector support. Hereu-Morales et al. (2024) discuss concerns that the transition may lead to job losses in certain industries, particularly those in the energy industry reliant on fossil fuels. Although job losses in this industry are a real possibility, Ram et al. (2020) argue that created jobs in the renewable industry outweigh those losses and will account for approximately 80% of new jobs generated by 2050. Despite these challenges, the growth of green finance presents a significant opportunity to bridge the funding gap and accelerate the transition.

To ensure that investments are channelled effectively toward projects that genuinely contribute to climate neutrality, the EU Taxonomy for Sustainable Activities (henceforth, the Taxonomy) was created. It serves as a classification system that defines which economic activities can be considered environmentally sustainable. It sets clear and science-based criteria that help policymakers, businesses and investors determine which activities will contribute to environmental objectives (European Commission, 2025). The Taxonomy increases transparency and decreases greenwashing, clearly defines key performance indicators and helps better address the environmental and ecological challenges by linking the capital flow to sustainability goals (Dusík & Bond, 2022; Hummel & Bauernhofer, 2024; Pacces, 2021). It fosters investor confidence and accelerates green investments. The Taxonomy mandates detailed reporting on how economic activities align with its sustainability criteria. Empirical evidence indicates that stricter disclosure requirements contribute to an increase in capital allocation to environmentally friendly projects, for example, Su et al. (2023) found that environmental information disclosure significantly enhances the efficiency of capital allocation but the effect varies by company size, ownership, life cycle and region. While the transparency mechanisms are important to boost confidence and decrease greenwashing, there is still a debate about whether they are enough to bring about significant change or whether they are more of a hindrance. Hummel & Bauernhofer (2024) point out that there is an increased bureaucratic burden that could negatively affect smaller and newer businesses. Kooths (2022) argues that climate policies should include stricter regulatory measures like carbon taxes and bans on specific activities to hasten reaching the

goal. Despite the criticisms, the Taxonomy is undoubtedly an important policy that helps align financial markets with sustainability and climate goals. For example, in 2017 France issued their first sovereign green bonds and set a precedent for other governments (Agence France Trésor, 2024).

In general, international policies significantly influence green finance by providing important incentives for wider green finance use, increasing transparency and reporting, simultaneously aligning investment and money flows with environmental goals, especially low-emission development.

Ecological problems and green finance

The implementation of these international frameworks has significantly shaped the green finance market, particularly through the promotion of green bonds and sustainable investments. To assess the tangible impact of policy-driven finance on ecological outcomes, the following section presents statistical analyses examining the relationship between green bond issuance and net emissions.

Climate change is the most pressing environmental challenge. Since greenhouse gas emissions are the predominant driver of global temperature increases, extreme weather events and ecological disturbances, mitigating these emissions is the top priority for climate stability. The European Union has achieved measurable progress in reducing greenhouse gas emissions, Figure 1.

Figure 1
Net greenhouse gas emissions and trend in the EU-27 for 2014-2022, index 1990=100
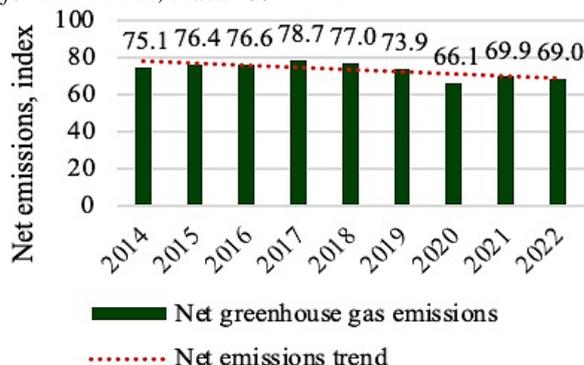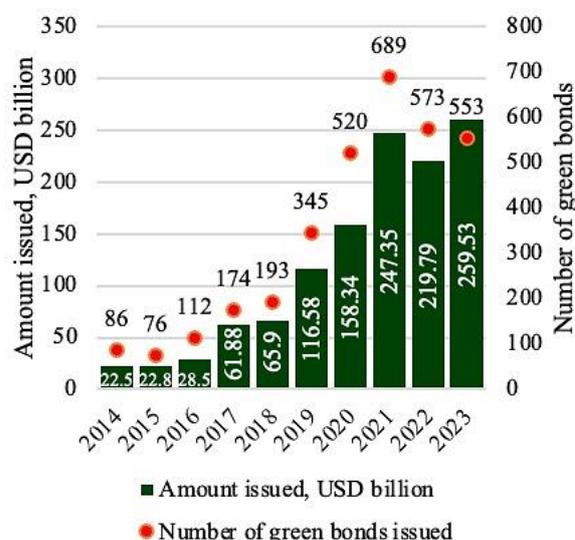

Source: authors' construction based on Eurostat, 2025.

The values indicate that emissions remained relatively stable between 2014 and 2018, fluctuating slightly but staying above 75. However, a notable decline was observed after 2019, with emissions dropping from 73.9 in 2019 to 66.1 in 2020, followed by a slight increase in 2021 (69.9) and stabilisation at 69.0 in 2022. One reason for the decline in emissions is the implementation of policies. Wang et al. (2024) emphasise the importance of green policies, as they provide economic incentives and help strategically allocate resources. Another factor driving this change is green finance - a tool that funds projects aimed at reducing emissions. The most utilised green finance

instrument by the EU and its Member States is green bonds. These instruments are used to finance green projects and, based on Climate Bonds Initiative (2024) data, in 2023 in Europe region, the biggest investments were in energy with 29%, 23% in buildings and 20% in transport. Green bonds, a key instrument of green finance, heavily rely on the Taxonomy. The introduction of the European Green Bond Standard in 2023 reinforced regulatory requirements for green bond issuance. Data from the Climate Bonds Initiative (2024) in Figure 2 indicate significant growth in green bond issuance and investor interest following regulatory advancements.

Figure 2
Total issuance and value of green bonds in the EU-27 (2014–2023)

Source: authors' construction based on Climate Bonds Initiative, 2024.

From 2014 to 2017 green bond market increased by USD 39.36 billion because of the influence of the Paris Agreement, mainly Article 2.1.c, which encouraged aligning financial flows with low-emission development. In 2018, the total amount of green bonds issued increased by 10.9%, while the number of bonds rose by 19. This period coincided with the launch of the European Union's Sustainable Finance Action Plan, which laid the groundwork and served as a precursor to the Taxonomy. As a result, in 2019, the green bond market experienced a significant expansion, with the total issuance amount increasing by 76.9% and the number of bonds rising by 78.8%. This is mainly due to the establishment of the framework that increased credibility and transparency in the green bond market. Although 2020 was a challenging year, there was a steady growth in the amount issued by 35.8%, but the number of deals increased by 50%. In 2020, the average size of a single green bond issuance was USD 0.30 billion, marking the lowest value during the analysed period. This suggests an overall increase in the number of green

bonds issued, even though the average issuance size was comparatively smaller. On 1 July 2021, the Taxonomy came into force, and there was a second significant expansion, with the total issuance amount increasing by 56.2% and the number of bonds rising by 32%, which reflects increasing investor confidence because of regulatory clarity. The average size of a single green bond issuance also increased and reached USD 0.36 billion. The Taxonomy had such an impact on the green bond market because, in comparison to previous frameworks, it introduced a science-based, standardized and legally binding system for defining sustainable activities. It boosted investor confidence, attracted larger issuers and expanded the green bond market. In 2022, due to economic and geopolitical uncertainties, the total amount and number of green bonds issued decreased. However, the average size of a single green bond issuance increased by USD 0.02 billion, indicating a shift toward larger-scale issuances despite the overall market contraction. Although in 2023 the number of green bonds issued decreased by 20, the amount issued increased and reached its peak - USD 259.53 billion. The average size of a single green bond issuance also reached its peak - USD 0.47 billion. This trend suggests that while the total number of green bonds issued fluctuated, the market increasingly favoured larger-scale issuances, likely driven by institutional investors and regulatory advancements. The record-high issuance amount in 2023 highlights the resilience and growing maturity of the green bond market, despite prior economic uncertainties.

It is concluded that policies have an impact on green finance, especially on the green bond market. To understand the relationship between green bonds and net emissions, the authors conducted a Pearson correlation analysis. The results show a strong negative correlation ($r = -0.807$, $p = 0.009$), which indicates that a higher amount of green bonds is associated with lower emissions. A linear regression analysis revealed that green bond issuance explains 56.1% of the variance in net emissions ($R^2 = 0.561$, $p = 0.009$). These findings underscore the critical role of green finance in accelerating emissions reduction. Policies create a positive feedback loop by fostering green finance, which is then channelled into projects that directly contribute to lowering emissions and mitigating climate change. Furthermore, the substantial growth of the green bond market in response to policy interventions emphasises the need for continued regulatory support and financial incentives to maintain this trajectory.

Conclusions

1. International policies, such as the Paris Agreement, EU Taxonomy for Sustainable Activities and the European Green Deal, positively affect green finance markets because they serve as benchmarks for linking financial flows with ecological objectives while encouraging innovation, accountability and transparency.

2. The green bond market in the EU has grown significantly in the period from 2014 to 2023 – by USD 237.01 billion, which was influenced by policy implementation that increased issuers and investor confidence.

3. Green finance is crucial for addressing ecological problems, which is supported by the results from Pearson correlation analysis between the amount of green bonds and net emissions that show a strong negative correlation – a higher amount of green bonds associated with lower emissions by directing financial resources towards sustainable projects.

4. Overall, policy and regulation have a critical role in fostering a favourable green financial environment.

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