【Articles】

The European Sustainable Covered Bond Market and Its Role in Green Finance

欧州サステナブル・カバードボンド市場の現状と課題

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Contents

(Abstract)

This paper systematically examines the institutional structure and market challenges of sustainable covered bonds and presents prospects for institutional maturity and market development with a focus on their connectivity to the EU Taxonomy. First, after confirming the institutional features of conventional covered bonds, it categorizes sustainable covered bonds into three types—green, social, and sustainability—and reviews major cases in Europe. It then identifies key institutional and practical challenges, such as regional concentration of issuers, collateral asset dependence, inconsistencies in ESG assessments, and the underdevelopment of the secondary market. Furthermore, it explores the institutional linkages with the EU Taxonomy and SFDR, emphasizing the reliability of disclosure for ESG bonds and the traceability

of collateral assets. The analysis also highlights the alignment of collateral assets with the SDGs, particularly their structural advantages in financing SDG 11 (Sustainable Cities and Communities). Based on these findings, the study concludes that while sustainable covered bonds have the potential to serve as a core infrastructure for ESG finance, policy measures such as the standardization of ESG assessments and the improvement of market liquidity are indispensable.

Keywords: Sustainable covered bonds, sustainable finance, ESG investment, EU Taxonomy, Greenium, SDGs

1. Introduction

Against the backdrop of worsening climate change, apparent resource constraints, and growing social injustice, building a sustainable economy and society has emerged as an international policy issue. Financial and securities markets also require mechanisms to promote the circulation of funds that contribute to solving these issues, and sustainable finance is attracting attention as part of this effort. Sustainable finance is an institutional and market framework that supports the sustainability of economic activities from a financial perspective and channels private funds through ESG-conscious investment.

This concept forms a multi-layered system encompassing ESG investing, socially responsible investing (SRI), ethical finance[1)], and impact investing. Policy development and market expansion are progressing rapidly in various countries (Yanata, 2025). Amid this trend, covered bonds—historically utilized by financial institutions as a funding tool due to their low credit risk and high safety—are increasingly incorporating sustainable finance elements.

Covered bonds are bonds backed by assets such as mortgages and public sector loans, offering high security and credit enhancement. Covered bonds have a long history, particularly in Europe, and have been institutionally developed as investment-grade assets with excellent credit enhancement.

In 2014, the world's first social covered bond was issued in Germany, followed by the emergence of green covered bonds in 2015.

This connected the traditional covered bond market with the concept of sustainable finance, promoting the formation of a new sustainable bond market. Subsequently, the development of the EU taxonomy system has also provided an impetus, and the market continues to expand steadily.

Based on these international trends, this paper theoretically examines the institutional framework and market structure of sustainable covered bonds, as well as their potential for development. First, after outlining the legal framework and structural characteristics of covered bonds, it analyzes the transition process to issuance formats incorporating ESG elements,

trends in issuers and collateral assets, and methods for assessing ESG compliance. Next, it examines issues such as alignment with the EU Taxonomy, regulatory oversight challenges, and uncertainties associated with disclosure. Furthermore, it considers the potential spillover effects to non-EU countries and the necessity for international regulatory harmonization.

The statistical analysis in this paper primarily relies on aggregate data from the European Covered Bond Council (ECBC). As the ECBC is the leading industry association in Europe and over 95% of covered bond issuance is attributed to its member institutions[2)], the analysis in this paper using ECBC data is considered to accurately reflect market realities.

2. Legal Framework and Credit Enhancement Structure of Covered Bonds

(1) The Covered Bond System and Overview

To examine the institutional positioning of sustainable covered bonds, we first outline the origins and basic structure of covered bonds. Covered bonds originated in 18th-century Prussia as land mortgage bonds called "Pfandbrief," subsequently developing into a traditional bond primarily across continental Europe. For a long time, this form did not exist in Anglo-American markets and evolved as a system unique to continental Europe. Covered bonds are essentially positioned as a type of corporate bond, issued by financial institutions for funding purposes.

Subsequently, in Denmark during the late 18th to early 19th century, real estate mortgage bonds (Realkredit) were introduced as a means to finance reconstruction following a major fire3. Alongside Prussia's Pfandbrief, this system later became recognized as a type of covered bond and subsequently spread to other European countries, including France and Poland. Through this historical development, they are now collectively referred to as "covered bonds" and have established their status as financial instruments with high creditworthiness and stability.

Furthermore, looking at their functional aspects, early covered bonds were introduced in Germany for agricultural land financing, in Denmark and Poland for reconstruction from urban fires, and in France for raising funds for real estate development. However, their use subsequently expanded into urban real estate financing, and in recent years, they have also been utilized for refinancing mortgage loans and public sector loan receivables. Today, they are widely used by banks as a stable and efficient means of raising funds.

Thus, covered bonds have developed primarily in continental Europe. However, in recent years, there has been a noticeable trend of expansion into regions including Asia and Latin America. Particularly, during the 2008 global financial crisis and the subsequent European debt crisis, while many financial asset markets experienced turmoil, the covered bond market demonstrated a relatively early recovery. This served as a catalyst for its international proliferation (Yanata, 2010). Thus, while originating in European markets, covered bonds have established themselves as a global financial instrument today, underpinned by their high creditworthiness and stability.

Regarding the collateral assets, cover pools primarily comprise residential mortgage

Table 1: Overview Comparison between Covered Bonds and Securitized Products (e.g., ABS, RMBS)

	Covered Bonds	Securitized Products (e.g., ABS, RMBS)
Asset Ownership	Issuer (On-balance sheet)	SPV (Off-balance sheet)
Investor Claim	Issuer + Cover Pool (Dual Recourse)	In principle, only SPV's assets (Non-recourse)
Legal Basis	Based on special laws or banking laws	Based on private contractual agreements
Collateral Asset Management	Segregated cover pool	Asset transfer via true sale
Credit Rating Tendency	High ratings	Varies depending on asset quality and structure
Liquidity	High (especially benchmark bonds)	Varies by individual case

Notes: *SPV (Special Purpose Vehicle)* : A legal entity created solely for a specific business purpose.
True Sale : A legal sale in which the ownership of assets is fully transferred.
(Source: Created by the author)

loans, public sector loans, and ship mortgage loans. Since the 2008 financial crisis, the proportion of residential mortgage loans has increased significantly, accounting for approximately 90% of the total across Europe as of the end of 2023 (author's calculation based on ECBC, 2024, p.555, Table 5.2.2). Regarding the interest rate structure of loans within the cover pool, the proportion of fixed-rate loans based on outstanding balances has generally reached around 80% in recent years (ECBC, 2024, p.550, Figure 7-8). This is important for investors as it provides a stable cash flow expectation.

This asset composition and interest rate characteristic gives covered bonds the nature of a long-term stable asset. Although legally distinct from asset-backed securities (ABS, MBS, etc.), as shown in Table 1, covered bonds possess robust credit enhancement mechanisms. These include an institutional framework based on special laws and banking regulations, an on-balance-sheet issuance structure, a dual recourse structure enabling investor claims against both the issuer and the cover pool, and the existence of statutory priority rights. As a result, among financial products backed by collateral assets, covered bonds are characterized by their ability to maintain high creditworthiness and stable marketability.

Including the aforementioned elements, the main features of covered bonds can be summarized into six points: ① on-balance sheet issuance structure, ② dual recourse (dual investor claims), ③ clear legal basis, ④ strict collateral asset management system, ⑤ flexible collateral adjustment function via dynamic pools, and ⑥ institutional reliability and well-developed market infrastructure. These elements demonstrate that covered bonds are financial products based on an institutional framework distinct from securitized products, forming the foundation that supports their high creditworthiness and market stability. The next section details these points sequentially.

(2) Structural Features of Covered Bonds

Covered bonds possess a structure that is distinctive compared to securitized products

and other debt instruments. Specifically, this structure is as follows:

① On-Balance Sheet Structure

Covered bonds are on-balance sheet bonds, meaning they are issued while remaining on the balance sheet of the issuing financial institution. That is, both the covered bond debt (liability) and the underlying collateral assets (such as residential mortgages or public sector loans) are managed while remaining on the issuer's balance sheet. The issuer retains ownership and management responsibility for the collateral assets, and the resulting cash flows accrue to the issuer.

This on-balance sheet structure means the issuer bears direct responsibility for debt repayment obligations. Consequently, investors assume the issuer's credit risk, similar to investing in ordinary corporate bonds. However, a key feature of covered bonds is that investors have a priority right to repayment from the collateral assets, which are segregated and managed as a cover pool, even in the event of the issuer's default. This investor protection framework enables a dual recourse structure, allowing access to both the issuer's credit and the collateral assets. This dual recourse forms the institutional foundation supporting the high credit quality of covered bonds (details discussed later in section ②).

In this respect, covered bonds are fundamentally different from typical securitization products (such as ABS or MBS). Securitization employs an off-balance-sheet structure where the issuer makes a true sale[4] of the collateral assets to a special purpose vehicle (SPV), transferring them off its balance sheet, after which the SPV issues the securities. Under this mechanism, investors hold a non-recourse claim solely against the assets held by the SPV, without relying on the issuer's creditworthiness. Thus, the key institutional differences between covered bonds and securitized products lie in whether they are on-balance sheet or off-balance-sheet, and whether the claim is dual recourse or non-recourse.

② Dual Recourse

Covered bonds feature a dual recourse structure, which institutionally guarantees repayment claims against both the issuer and the cover pool. This mechanism serves as a central element of investor protection. Specifically, even if the issuer fails, investors can receive repayment from the segregated cover pool assets with priority over other general creditors. Furthermore, if repayment from the cover pool assets alone does not fully satisfy the debt, investors are permitted to claim the remaining amount from the issuer's liquidation estate on an equal footing with other general creditors.

Thus, the institutionally secured dual credit enhancement from both the issuer and the cover pool provides covered bonds with a mechanism to protect investors' repayment claims even in the event of issuer default. This feature is a primary basis for the exceptionally high creditworthiness of covered bonds.

Furthermore, unlike other securitized products, covered bonds do not involve a true transfer where legal title to the collateral assets is separated from the issuer. The collateral

assets remain on-balance sheet, managed by the issuer who retains both ownership and management responsibility. This on-balance sheet structure, linked to point ① above, forms the foundation supporting investors' priority repayment rights.

Thus, the high creditworthiness and safety of covered bonds are underpinned by a system design centered on the dual recourse structure, which leverages the credit of both the issuer and the collateral assets in a layered manner.

③ Legal Framework

Covered bonds are financial instruments issued under each country's legal system, and this institutional backing is a key factor supporting their creditworthiness. Particularly in European countries, many nations have established special laws detailing the types of collateral assets, loan-to-value (LTV) ratios, issuer requirements, and cover pool management procedures. Covered bonds issued under such legal frameworks are called "Legislative Covered Bonds"[5]. Typical examples include Germany's Pfandbrief Act (Pfandbriefgesetz) and France's Law No. 99-532 of June 25, 1999, on various provisions relating to savings and financial security (Loi n° 99-532 du 25 juin 1999 portant diverses dispositions relatives à l'épargne et à la sécurité financière).

Furthermore, under the legislative-type system, issuers establish a framework for segregated management of eligible assets based on statutes and undergo continuous supervision by regulatory authorities, ensuring high transparency and investor protection. Consequently, many issues receive high ratings of AA to AAA from rating agencies and are widely recognized in the market as safe assets comparable to government bonds.

In contrast, in jurisdictions like the UK that lack a traditional civil law framework, a "regulated covered bond" system has been established. This combines a contractual issuance structure with legal oversight, maintaining high creditworthiness under the registration and disclosure regime administered by the UK Financial Conduct Authority (FCA).

Although Japan lacks a statutory system, in November 2018, Sumitomo Mitsui Banking Corporation issued a €1 billion structured covered bond using a contractual framework. This practical precedent provides insights for developing such a system (SMBC Group, 2025).

Thus, diverse legal frameworks—primarily statutory but also including regulatory and contractual types—have been established in various countries. By adding institutional backing and transparent operational systems to the issuer's creditworthiness, these frameworks form a crucial foundation supporting the creditworthiness and market reliability of covered bonds.

④ Collateral Asset Management

Strict collateral asset management systems are a core element supporting the reliability and institutional creditworthiness of covered bonds. In countries with statutory covered bond systems, financial institutions as issuers are legally obligated to appropriately manage the value and risk of the cover pool. Specifically, regular monitoring is required from the asset pool formation stage regarding factors such as maintaining eligibility, valuation fluctuations,

and borrower repayment status.

A prime example is Germany's Pfandbrief system. Under the Pfandbrief Act, requirements for collateral assets, loan-to-value ratios, and segregated management systems are strictly defined. The supervisory authority, BaFin (Federal Financial Supervisory Authority), reviews the adequacy of issuers' cover pool management and compliance with regulations, possessing the authority to impose corrective measures when necessary. Furthermore, issuers are required to appoint an independent cover pool monitor, who reports directly to BaFin.

Similar institutional designs have also been introduced in France and the Nordic countries, where the eligibility of collateral assets, LTV caps, and liquidity standards are clearly defined by law. Additionally, external auditors evaluate and disclose the composition and risk status of collateral assets, ensuring transparency and accountability to investors.

Thus, in addition to the issuer's internal controls, a multi-layered monitoring system involving supervisory authorities and external auditors' functions synergistically. This maintains the institutional creditworthiness of the system, ensuring debt fulfillment to investors even amid market fluctuations or deterioration of collateral assets.

⑤ Dynamic Pool

Covered bonds employ a "dynamic pool" mechanism within their cover pool to flexibly respond to changes in the status of collateral assets[6]. This system allows issuers to add new eligible assets during the covered bond's life if collateral assets decrease due to repayments or amortization, or if they no longer meet initial eligibility criteria. This maintains the overall collateral value of the cover pool and the coverage ratio (collateral asset balance / covered bond balance) at predetermined levels.

Specifically, collateral assets like residential mortgages and public sector loan receivables decrease over time due to borrower repayments and amortization. Additionally, changes in market conditions, such as declines in real estate prices, or events like borrower delinquency or default, can cause some assets to no longer meet the eligibility criteria. To address such situations, issuers are contractually and legally obligated to add new collateral assets in a timely manner, ensuring the cover pool's asset value is always maintained at an appropriate level.

This adjustment mechanism enables covered bonds to exhibit high resilience against market fluctuations and individual asset credit deterioration, allowing them to consistently maintain a high level of creditworthiness. For investors, the institutional reduction of collateral value depreciation risk, combined with the issuer's creditworthiness, positions covered bonds as financial instruments recognized for their exceptionally high safety.

⑥ Market Infrastructure and Institutional Reliability

The institutional reliability of covered bonds and the development of market infrastructure are also crucial elements supporting their creditworthiness. The "Covered Bond Label" system, established in 2012, is a voluntary certification scheme operated by the Covered Bond

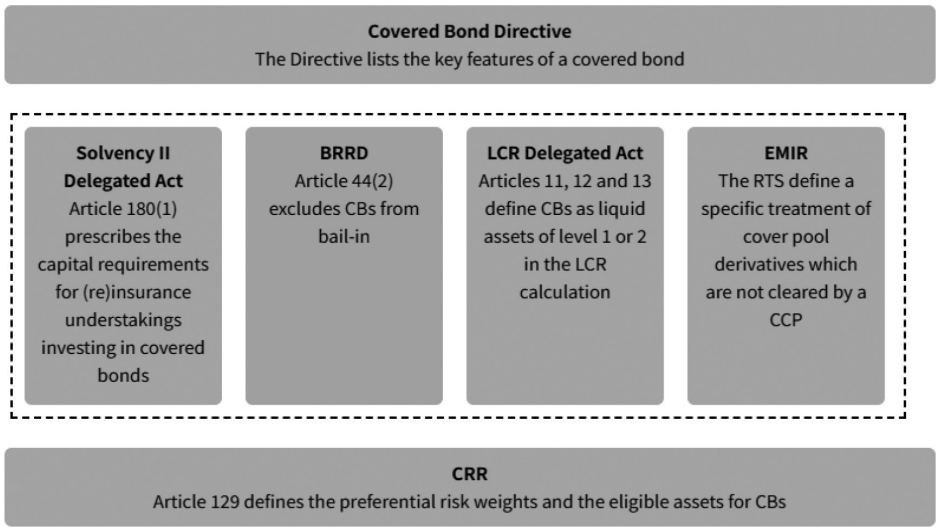
Label (CBLF), which was established by the European Mortgage Federation – European Covered Bond Council (EMF-ECBC). It aims to enhance market transparency and comparability[7].

Although this system is not legally binding, it requires issuers to regularly disclose information on the attributes of collateral assets, debt structure, and compliance with national legal systems using a standardized format (Harmonized Transparency Template). This enables investors to access detailed information on an ISIN basis, improving comparability between issues and market transparency. As of August 2024, the Covered Bond Label has been awarded to 145 issuers and 182 cover pools, covering over 5,700 issues with a nominal outstanding amount of approximately €2.4 trillion (ECBC, 2024, pp.31–32).

Parallel to the Covered Bond Label system, "Benchmark Covered Bonds" are widely accepted in European markets. General requirements include being euro-denominated, fixed-rate, and having an issue size of at least €500 million, characterized by high liquidity. These securities gain transparency and credibility through obtaining the Covered Bond Label and also gain access to a diverse investor base by being listed on exchanges.

Furthermore, benchmark covered bonds are recognized as eligible collateral in the European Central Bank's (ECB) monetary policy and are also used as refinancing instruments (collateral for liquidity provision in market operations) by central banks. This further enhances their value as a low-cost, stable funding source for issuers.

Supporting these market infrastructure and transparency enhancement efforts from a regulatory perspective is the Covered Bond Directive (CBD), adopted in 2019 and implemented in July 2022. The CBD resolves regulatory fragmentation and enhances systemic stability by introducing uniform legal standards for issuance requirements, investor protection, and cover pool management, ensuring consistency with statutory covered bond regimes across EU mem-



(Source) European Covered Bond Council

Figure 1 EU regulatory framework

ber states.

Furthermore, the CBD is systematically linked to existing regulations such as Solvency II (insurance capital requirements), CRR (Capital Requirements Regulation), LCR Delegated Act (treatment of liquid assets), EMIR (derivatives regulation), and BRRD (Bank Recovery and Resolution Directive), occupying a core position within the EU's overall financial regulatory framework (Figure 1). This systemic connectivity forms a fundamental condition supporting the reliability and potential for widespread adoption of sustainable covered bonds.

Thus, covered bonds have gained international traction and established a solid position as a financial product with high creditworthiness and stability, underpinned by institutional development and strengthened market foundations centered on the European market. In recent years, issuance of sustainable covered bonds has expanded as a new form incorporating sustainability perspectives.

(3) Framework and Types of Sustainable Covered Bonds

Sustainable covered bonds are a new issuance format that utilizes the credit enhancement structure inherent to traditional covered bonds while aiming to provide funding for environmental and social sectors. Their institutionalization is progressing, primarily in Europe. As of the present time (September 2025), there is no legally established uniform definition for "sustainable covered bonds." This is because the term "sustainable" is a broad concept encompassing various elements of ESG (environmental, social, and governance). However, in market practice, a classification based on the use of proceeds and the nature of collateral assets is becoming established, and this paper examines representative types based on that framework.

Sustainable covered bonds can be broadly classified into two types based on the use of proceeds and the nature of collateral assets. First, there is the "Use of Proceeds" type, which clearly limits the use of the raised funds to green or social projects. In this case, the cover

Table 2: Types and Characteristics of Sustainable Covered Bonds

Type	Use of Proceeds	Examples of Underlying Assets	Alignment with ICMA Principles
Green Covered Bond	Projects related to environmental issues such as energy-saving buildings, renewable energy, and environmental protection	Mortgage or real estate loans with high energy efficiency	Green Bond Principles
Social Covered Bond	Social projects such as social housing, education, healthcare, and welfare	Mortgage loans for lowincome households, loans to public institutions	Social Bond Principles
Sustainability Covered Bond	Projects with both environmental and social objectives	Loans contributing to both environmental and social goals	Sustainability Bond Guidelines

(Source) Created by the author

pool consists of conventional residential mortgages and public sector loans. Second, there is the "Collateral Asset Type," in which the cover pool itself consists of environmentally or socially eligible loans.

This type places emphasis on the sustainability of the collateral assets themselves, and is therefore also referred to in practice as the "green cover pool type."

Based on this classification into two types, the form of issuance has been further specified in practice, developing into three types: green covered bonds, social covered bonds, and sustainability covered bonds (Table 2). The characteristics of each are detailed below.

Green Covered Bonds

Green covered bonds are covered bonds intended to finance projects that provide clear environmental benefits, such as climate change mitigation and adaptation. Eligible assets include energy-efficient homes and buildings, as well as renewable energy facilities. Issuers are establishing issuance frameworks that comply with the Green Bond Principles (GBP) of the International Capital Market Association (ICMA) to ensure transparency and reliability.

In Europe in particular, green covered bonds dominate sustainable covered bonds in terms of both the number of issues and the amount issued, and the use of "green cover pools," in which the cover pool itself consists of highly environmentally eligible assets, is also progressing. This method requires strict screening and continuous maintenance of the environmental eligibility of collateral assets.

Social Covered Bonds

Social covered bonds are covered bonds that aim to finance projects that solve social issues and create social benefits, such as education, healthcare, welfare, regional revitalization, and the provision of affordable housing. Eligible assets include mortgages for low-income individuals and loans for social infrastructure development by local governments and public institutions, with particular emphasis on social impact through the public sector.

Issuers are establishing issuance frameworks that comply with the ICMA's Social Bond Principles (SBP) and are striving to ensure transparency in the use of funds and the evaluation and selection process. Although the market size of social covered bonds is smaller than that of green covered bonds, it is steadily expanding and is an area with promising future growth.

Sustainability Covered Bonds

Sustainability covered bonds are covered bonds with a combination of uses of proceeds that contribute to both environmental and social aspects, combining the characteristics of both green covered bonds and social covered bonds. For example, financing for low-income housing with energy-saving features is a typical example of a project that meets both environmental (energy efficiency) and social (housing accessibility) requirements.

Issuers are establishing issuance frameworks based on the ICMA Sustainability Bond

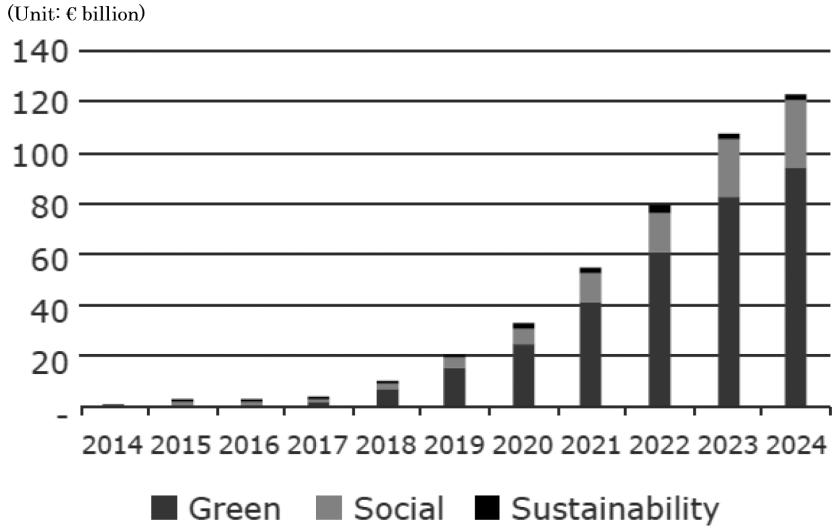
Guidelines (SBG) and striving to clarify the use of proceeds, selection criteria, and reporting systems. However, the number of issuances is currently limited, and they account for only a small proportion of all sustainable covered bonds. Nevertheless, the scope of eligible assets is broad, and expectations for future market growth are high.

While the various guidelines established by ICMA are not legally binding, they are widely referenced as important practical compliance frameworks. These guidelines center on four core elements: 1. Clarification of fund usage, 2. Project evaluation and selection, 3. Fund management, and 4. Information disclosure. They have become established as an internationally common issuance framework. Furthermore, many issuers enhance market credibility by establishing issuance systems based on these guidelines and obtaining third-party assessments (Second Party Opinions, SPO) from external specialized institutions to demonstrate compliance (ECBC, 2024, pp.33–34).

Furthermore, the EU has introduced the "EU Taxonomy (Regulation (EU) 2020/852)"[8] as a legal framework for classifying and evaluating the eligibility of environmentally sustainable economic activities and related assets. This system provides issuers with objective criteria for asset selection and functions as an institutional foundation ensuring comparability and transparency of information for investors (details are examined in Chapter 4). Thus, both the voluntary guidelines (self-regulation) developed by ICMA and the legally binding rules established by the EU (such as the EU Taxonomy) function complementarily as institutional infrastructure supporting the credibility of sustainable covered bonds, contributing to the market's sustainable development.

Notably, despite lacking legal enforceability, ICMA's guidelines enjoy broad international acceptance and are becoming established as a de facto standard framework in Japan as well (Yanata, 2025, pp.36–39). Establishing an issuance framework based on these guidelines not only enhances the credibility of sustainable covered bonds but is also crucial as a means of accessing international capital markets. Furthermore, for ESG-oriented investors, it is regarded as a reliable indicator on which to base investment decisions, contributing to the transparency of the market as a whole. Regular post-issuance reports on the use of funds and impact reports are also essential elements in fulfilling accountability to investors.

In this way, sustainable covered bonds are developing as a means of providing funds that contribute to solving both environmental and social issues through the three types of green, social, and sustainability. Although there are differences in the characteristics of eligible assets and the issuance framework for each type, they are being developed in line with institutional frameworks such as the ICMA guidelines and the EU taxonomy, and are positioned as an important pillar of sustainable finance in the international capital markets.



Source: Adapted by the author from European Covered Bond Council (2024), p.41, Figure 1.

Figure 2. Outstanding Volumes of Sustainable Covered Bonds (2014–2024)

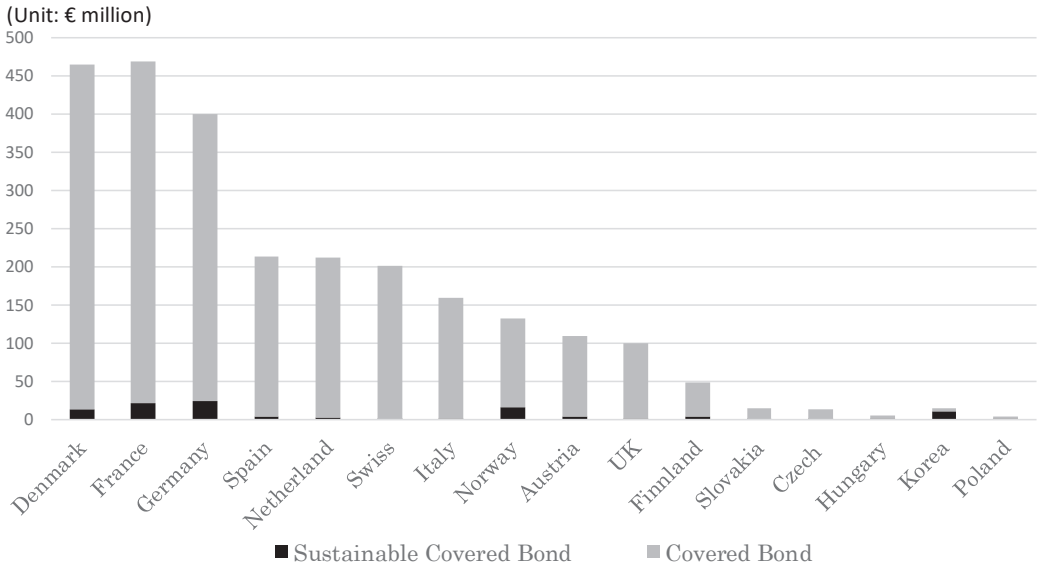
3. Current Status and Institutional Issues of the Sustainable Covered Bond Market

(1) Market Growth and Regional Development

The sustainable covered bond market has grown rapidly in recent years against the backdrop of expanding ESG investment and growing interest in the SDGs. As shown in Figure 2, outstanding issuance has surged since the dawn of the market in 2014, particularly after 2018, reaching €108.5 billion by the end of 2023 and further increasing to €122.8 billion by the end of June 2024 (ECBC, 2024, p.41). This remarkable expansion clearly demonstrates that sustainable covered bonds are becoming institutionally established in the international capital markets.

The starting point for this growth was the world's first ESG covered bond (the so-called Social Pfandbrief), backed by cooperative mortgages, issued in September 2014 by Münchener Hypothekenbank, a German bank specializing in real estate finance. The following year, in 2015, Berlin Hyp, also in Germany, issued the world's first green covered bond (Green Pfandbrief), contributing significantly to the formation of the market foundation in terms of both institutional and practical aspects. Subsequently, issuances followed one after another in European countries, including France, with the issuance of green covered bonds (Green Obligation Foncière) by housing finance institutions becoming particularly active in France. These developments are forming a trend that positions sustainable covered bonds as a domain of sustainable finance (ECBC, 2024, p.42).

Focusing on issuance types, green covered bonds still dominate the market, but in recent



Source: Created by the author with reference to European Covered Bond Council (2024), p.556.

Figure 3. Outstanding Amounts of Sustainable Covered Bonds by Country (as of End-2023)

years, the proportion of social covered bonds and sustainability covered bonds has also been steadily increasing (Figure 2). Looking at the structure by issuing country, the top five countries in terms of outstanding issuance at the end of 2023 were Germany (€24.1 billion), France (€21.4 billion), Norway (€16.0 billion), Denmark (€13.1 billion), and South Korea (€10.4 billion) (ECBC, 2024, p.556), accounting for about 80% of the entire market (Figure 3). While European countries remain central, South Korea's rise indicates the market's geographical expansion while highlighting the persistence of regional concentration. This concentration could constrain medium-to-long-term market growth and stability, making issuer diversification crucial for enhancing market resilience. Progress in ESG policies, particularly in emerging economies, and the international institutional support underpinning them, are considered key to future market expansion.

Furthermore, concentration is also evident in the currency structure of issuances. Approximately 75% of total issuance is denominated in euros (ECBC, 2024, p.42). While issuances in US dollars, Swiss francs, and British pounds also exist, their scale is limited. The concentration of euro-denominated issuance stems from eurozone financial institutions targeting domestic sales, non-eurozone issuers seeking access to eurozone investors, and the ECB utilizing covered bonds as a monetary policy tool. Furthermore, examining the composition of the cover pool reveals that approximately 94% consists of residential mortgage loans, with the remaining roughly 6% comprising public sector loans (ECBC, 2024, pp.554–555), indicating a similarly skewed distribution in collateral assets. In essence, the sustainable covered bond market exhibits a structure with an extremely high dependency on the residential mortgage

sector.

Because mortgages involve long repayment periods, financial lending institutions must ensure the circulation of funds (i.e., securing sources for new lending), necessitating the securitization of loan assets as a means to achieve this. In this regard, while the United States and the United Kingdom developed funding through securitization, Europe established covered bond systems earlier, institutionally establishing them as a funding mechanism backed by mortgage-backed securities (Yanata, 2011). These differing institutional choices are thought to have shaped the uneven distribution of collateral assets within the sustainable covered bond market.

Thus, the sustainable covered bond market exhibits structural characteristics including geographical concentration among issuing countries, a focus on euro-denominated issuance, and a reliance on residential mortgages as collateral assets. Nevertheless, sustainable covered bonds are steadily establishing their position as a means to build a sustainable financial system. If interest in ESG investing and the SDGs continues to grow, further issuance expansion is anticipated.

However, as of 2024, sustainable covered bonds account for only about 3.6% of the total outstanding covered bond issuance (approximately €3.3 trillion), indicating their share of the overall market remains limited (ECBC, 2024, p.41). This indicates that sustainable covered bonds currently have a small presence in the market, but it also signifies significant potential for future growth. Against the backdrop of expanding ESG investment and progress in regulatory frameworks, further adoption of sustainable covered bonds is anticipated.

(2) Market Structure and Institutional Characteristics

The sustainable covered bond market is expanding geographically alongside progress in regulatory frameworks, driven by increased issuance across countries. Concurrently, the market structure exhibits distinct characteristics, such as the composition of collateral assets and issuance currencies. Structural features like currency concentration and reliance on residential mortgages within the cover pool form a common foundation across the market, shaping the institutional and operational nature of sustainable covered bonds.

In fact, in Germany, France, the Nordic countries, and South Korea, which account for a large portion of outstanding issuance, developments are progressing in accordance with their respective institutional and market characteristics.

In Germany, building on the traditional foundation of the Pfandbrief market, Berlin Hyp issued the world's first green covered bond in 2015, and since then, there have been a number of cases combining institutional consistency and environmental compatibility. Mortgage banks have also been continuously issuing sustainable covered bonds secured by mortgages and public loans, and the outstanding amount of these bonds at the end of 2023 will be the largest in the world (ECBC, 2024, p.556).

In France, specially authorized financial institutions such as Sociétés de Crédit Foncier and Sociétés de Financement de l'Habitat issue bonds backed by sustainable assets through various types of obligations foncières. In particular, Compagnie de Financement Foncier issued

€500 million in social covered bonds in 2023, which were used to finance public healthcare infrastructure and social housing projects (Compagnie de Financement Foncier, 2024, p.3).

In Northern Europe, the issuance of green covered bonds is progressing, mainly in Norway, Denmark, and Sweden. DNB, Nykredit, Swedbank, and others have been actively issuing them in recent years. In Norway in particular, DNB Boligkreditt has been continuously issuing green covered bonds backed by mortgages, driving the market. In addition, Swedbank, one of the largest banks in the Nordic region, began issuing them in 2024, and Sweden's presence in the European market is likely to increase in the future (Swedbank, 2025).

In Asia, South Korea has one of the few statutory covered bond systems outside Europe, and its outstanding issuance balance is the largest outside Europe (over €10 billion). Kookmin Bank launched Asia's first covered bond program in 2015, issued sustainability covered bonds in 2020, and issued green covered bonds in 2021 (Kookmin Bank, 2023, p.19).

In Japan, on the other hand, the Japan Housing Finance Agency issues mortgage-backed securities (so-called JHF MBS) on a large scale and continuously, and because the market is stable, the development of covered bond legislation and incentives for private financial institutions to issue covered bonds are relatively limited.

As shown above, various developments can be seen in countries and regions such as Germany, France, Northern Europe, and Asia, depending on their respective institutional backgrounds and financial practices. However, what underpins the sustainable development of the market as a whole, transcending these regional differences, is the establishment of institutional frameworks.

In the EU, cross-cutting frameworks for ESG finance, such as the EU Taxonomy and the Sustainable Finance Disclosure Regulation (SFDR), have been established. In response, the covered bond market is also building an issuance system that emphasizes sustainability. Furthermore, the EU Covered Bonds Directive (Directive (EU) 2019/2160), adopted in 2019 and implemented in 2022, provides a unified institutional framework that indirectly encourages issuers to transition toward sustainable finance. Furthermore, the EU Sustainable Finance Framework serves as direct institutional support encouraging covered bond issuers to align with ESG strategies.

On the other hand, several challenges remain for the continued expansion of the sustainable covered bond market. First, international standardization regarding the eligibility of sustainable assets and the measurement and evaluation of environmental and social impact is still under development. For example, frameworks currently used internationally include the EU Green Bond Standard developed by the EU and the Green Bond Principles (GBP) by ICMA. However, these coexist, and there are limitations to achieving complete consistency in their content. These inconsistencies in frameworks complicate application and comparison for issuers and investors.

Second, post-issuance reporting requires tracking the use of proceeds and measuring and disclosing their impact, which is also an issue. For small and medium-sized issuers in particular, the costs and human resource burdens associated with reporting based on the GBP and

SBP and obtaining SPOs are relatively large.

Third, the current excessive concentration of the market in specific countries and assets (primarily mortgages) requires improvement from the perspective of enhancing diversity and resilience. In particular, the uneven distribution of regulatory frameworks and issuance activity, centered on European countries, impacts the overall balance of the sustainable covered bond market.

As outlined above, while the sustainable covered bond market is steadily expanding, challenges remain to be overcome for its sustainable development. Institutional improvements to enhance market transparency and diversity will become increasingly important going forward. This involves standardizing definitions and evaluation methods for eligible assets, addressing the practical burdens associated with reporting, and tackling the regional and asset-based concentration of issuance.

(3) Practical Challenges Regarding Liquidity and Price Formation

While sustainable covered bonds have rapidly expanded as a market, unique challenges are gradually emerging. Here, based on previous discussions, we outline institutional and market challenges for future sustainable growth.

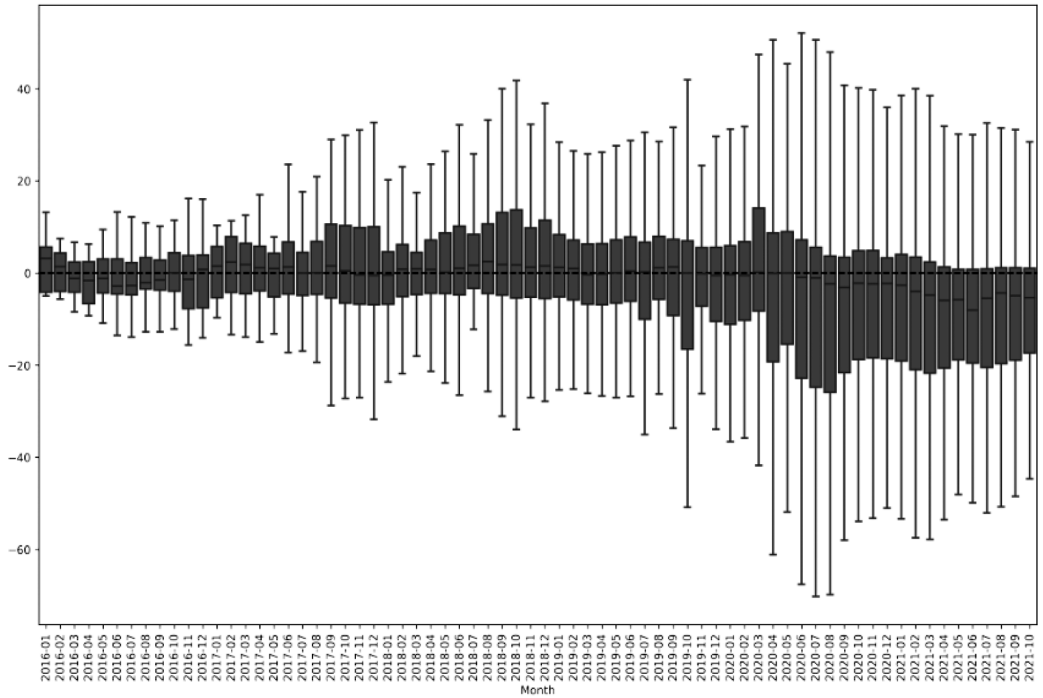
As a practical market structure challenge, the vulnerability of the secondary market is the primary concern. Sustainable covered bonds demonstrate strong demand in the primary market, but trading volumes in the secondary market remain limited. This stems from a supply-demand structure characterized by investors' strong preference for long-term holding (so-called buy-and-hold) and the limited absolute volume of bonds circulating in the market, which restricts opportunities for new acquisitions (ECBC, 2024, p.110).

This lack of market depth not only leads to price formation opacity and constraints on reinvestment opportunities but can also hinder medium-to-long-term market expansion by increasing exit costs for investors.

On the other hand, investor demand in the primary market remains robust. According to ECBC (2024), interest in sustainable covered bonds is growing annually. Broad demand is coming not only from sustainable investment funds, such as SFDR (Sustainable Finance Disclosure Regulation) Article 8 and Article 9 funds[9)], but also from traditional covered bond investors (ECBC, 2024, p.41). In fact, many issues have attracted subscriptions exceeding the issue amount, and the diversification of the investor base has become an important factor supporting market depth and stability.

As a result, there is a clear asymmetry between the buoyancy of the primary market and the low liquidity of the secondary market. In order to achieve sustainable market growth in the future, it is essential to develop the secondary market and improve liquidity.

Second, another issue is that the advantage of sustainable covered bonds in terms of price formation is not necessarily clear. Specifically, there is currently no consistent trend confirming whether there is a phenomenon known as the green premium, or greenium in practice, which refers to the tendency for issuance spreads to narrow compared to conventional bonds (ECBC,



Source: Pietsch, A., & Salakhova, D. (2022), p.5.

Figure 4. Distribution of Yield Spread Differences between Green and Conventional Bonds (Based on Matching Method)

2024, p.46).

The green premium here refers to the tendency for sustainable bonds to trade at lower yields (i.e., higher prices) compared to equivalent conventional bonds.

In the green bond market in particular, it is believed that the effects of sustainability are incorporated into prices as investors actively evaluate the value of sustainability.

Pietsch & Salakhova (2022), published as an ECB working paper, empirically confirmed a statistically significant spread reduction (green premium) of 5.3 bps for externally reviewed green bonds, 22.2 bps for bonds issued by green sector companies, and 17.4 bps for green bonds issued by UNEP FI member banks (Pietsch & Salakhova, 2022, pp.3–7). Furthermore, the monthly distribution of spread differences shown in Figure 4 reveals periods since 2020 when green bond spreads narrowed significantly. While this indicates that the greenium materializes under certain conditions, it also shows that overall variability is high and the phenomenon is not uniformly observable.

Therefore, the manifestation of the greenium effect depends heavily on the issuer's creditworthiness, bond size, market liquidity, and the presence or absence of external certification, and is not a phenomenon that applies uniformly to all green bonds. Even for sustainable covered bonds, the presence of sustainability factors does not necessarily translate directly into

clear economic benefits in the form of lower financing costs.

However, some market participants point out that in times of market instability and financial tightening, sustainability-oriented investors may contribute to stabilizing supply and demand and supporting the market. This view indicates that even if the economic incentives are limited, sustainable covered bonds have a certain institutional and social significance, providing an important perspective for future discussions on the diversification of market evaluation criteria.

Third, inconsistencies in ESG assessments and disclosure frameworks present challenges. While the social and environmental significance of sustainable covered bonds is emphasized, the content of disclosures and evaluation criteria vary significantly among issuers. Although international frameworks like the ICMA guidelines and the EU Taxonomy exist, the definition of eligible assets and the methodologies for impact assessment remain largely at the discretion of individual issuers and external assessment agencies. For smaller issuers in particular, the costs and staffing burdens associated with reporting and obtaining external evaluations (Second Party Opinions, SPOs) are relatively high, potentially acting as barriers to market entry. This heterogeneity in disclosure and evaluation undermines comparability for investors and weakens the overall market's credibility.

Furthermore, while the social significance of sustainable covered bonds is highly valued, the extent to which this value is substantively reflected in market structures remains open to verification. This gap between ideals and reality is a key issue constraining the market's healthy development.

Fourth, the direction of market development considering institutional constraints is a key challenge. Gradual improvements, such as expanding issuance volumes and standardizing disclosure criteria, are anticipated to address these issues. Efforts to ensure secondary market liquidity and enhance the reliability of ESG assessments hold particular significance for future market development.

Sustainable covered bonds hold certain social significance as a means to contribute to achieving the SDGs through funding primarily directed toward the housing market. However, the heavy concentration of fund usage in housing-related areas stems from institutional and structural constraints rooted in the nature of the collateral assets. Consequently, the sustainability goals achievable within the current framework remain limited.

This section identifies three issues for expanding the sustainable covered bond market: first, the fragility of secondary market liquidity; second, uncertainty regarding pricing advantages; and third, inconsistencies in ESG ratings and information disclosure systems. All of these are important issues that must be overcome to enhance market reliability and transparency. The limited presence of greenium and the fact that bond-level assessments remain complementary indicate the market's maturity and suggest that there is considerable room for improvement.

Therefore, going forward, it is essential to develop systems that leverage the existing institutional framework while enhancing market transparency and accountability to achieve a

more sustainable and reliable market.

4. ESG Rating Systems and Sustainability Assessment by Investors

(1) EU Taxonomy: Institutional Framework and Covered Bonds

As outlined in Chapters 2 and 3, the EU Taxonomy is widely referenced as the institutional infrastructure for sustainable finance in general and is positioned as an important standard for ESG assessment and collateral asset selection in the sustainable covered bond market. This section outlines its institutional structure and application requirements and examines its impact on the market. The EU Taxonomy is a regulation (Regulation (EU) 2020/852) enacted by the EU in 2020. It is a legal framework for classifying and defining "Environmentally Sustainable Economic Activities," for which technical standards have been phased in since 2022.

The system aims to curb greenwashing, avoid market fragmentation within the region, and improve the consistency, transparency, and comparability of information in the financial markets by providing uniform technical screening criteria for identifying environmentally sustainable economic activities.

It provides issuers with an objective basis for asset selection and serves as a common assessment framework for investors, enhancing the reliability of investment decisions based on environmental standards. Therefore, the EU Taxonomy is becoming increasingly important as a core infrastructure supporting institutional reliability and market transparency in the development of the sustainable covered bond market.

For a specific economic activity to be certified as "environmentally sustainable," it must meet all of the following three requirements. Specifically: ① Substantially contribute to one of the six environmental objectives defined by the EU[10]; ② Do no significant harm to other environmental objectives; and ③ Comply with minimum social safeguards based on international frameworks (Regulation (EU) 2020/852, Article 3).

These certification requirements institutionally establish a unified evaluation framework for environmental sustainability, significantly enhancing transparency and reliability of information within the EU's sustainable finance market. Particularly in the covered bond market, whether collateral assets comply with the EU Taxonomy is increasingly positioned as a key criterion in issuers' ESG assessments and investors' investment decisions.

Thus, while the EU Taxonomy supports the sustainable covered bond market from the perspective of "qualitative assessment" of financial products, the legal framework and certification system targeting the covered bond regime itself functions complementarily. Specifically, while the EU Taxonomy is a classification system focused on the environmental eligibility of collateral assets and fund usage, the EU Covered Bonds Directive establishes common rules for the institutional design of bond issuance and the credit enhancement framework. Although their scope and objectives differ, both function as mutually complementary institutional foundations supporting the reliability and transparency of the sustainable covered bond market.

The EU Covered Bonds Directive (Directive (EU) 2019/2162) was adopted in 2019 and became applicable on July 8, 2022. The directive aims to ensure consistency in covered bond regimes across EU member states, enhance the soundness and transparency of credit enhancement structures, and strengthen investor protection. Consequently, covered bonds within the EU now have their reliability and functionality institutionally guaranteed under a common legal framework (with transitional measures for existing bonds).

Furthermore, through linkage with the Covered Bond Label—a voluntary certification scheme operated by the European Covered Bond Council (ECBC)—product homogeneity and consistency in information disclosure are promoted, reinforcing investor protection. Issuers registered with the Covered Bond Label are required to regularly disclose detailed information, such as outstanding amounts, breakdown of collateral assets, maturity structure, and coverage ratios, based on the Harmonised Transparency Template (HTT). This disclosure regime enhances comparability among market participants and is highly regarded for improving the transparency of ESG-related information, particularly for sustainable covered bonds.

Therefore, the EU Taxonomy, the EU Covered Bond Directive, and the Covered Bond Label can be evaluated as a core infrastructure supporting the sustainable growth of the sustainable covered bond market, functioning as a mutually complementary institutional foundation. However, even as these systems are being developed, many challenges remain in the practical application of the EU Taxonomy.

In particular, the EU Taxonomy plays an extremely important role as a common standard for assessing the environmental eligibility of underlying assets in sustainable covered bonds. The development of this classification framework contributes significantly not only to ensuring institutional consistency but also to improving transparency and reliability in practice. Among these, sustainable covered bonds backed by green mortgages and green commercial real estate loans are attracting particular attention as they are considered to contribute significantly to "climate change mitigation," one of the six environmental objectives set forth in the EU Taxonomy.

Specifically, loans for energy-efficient housing and the construction and renovation of low-carbon buildings are classified as taxonomy-aligned assets in the EU taxonomy, and covered bonds secured by these assets are positioned as financial products with clear environmental significance.

A representative example of how this taxonomy framework is being applied in practice is the initiative by Berlin Hyp in Germany. The company is a pioneer in issuing Green Pfandbriefe in accordance with the EU Taxonomy, and its framework sets out detailed standards for the conformity assessment of target assets, the screening process, and information disclosure procedures (Berlin Hyp AG, 2025). These efforts have earned Berlin Hyp's bonds high praise for their environmental transparency and consistency, drawing attention as a leading example of the practical application of the EU taxonomy.

(2) Application and Challenges of the EU Taxonomy

The "sustainability" of sustainable covered bonds is heavily dependent on the compliance of the collateral assets with the EU taxonomy. When underlying assets such as residential mortgages or real estate loans meet the technical screening criteria, covered bonds backed by them are recognized as environmentally sustainable financial products. This enables issuers to expect improved ESG ratings and preferential treatment in raising funds from investors.

Furthermore, the Covered Bond Label guidelines also recommend information disclosure that takes into account consistency with the EU Taxonomy. In the future, taxonomy compliance is likely to become the de facto standard in the market. When issuing sustainable covered bonds, there will be a growing emphasis on both institutional and practical aspects, not only on whether the underlying assets are simply "green loans," but also on whether they comply with the EU Taxonomy classification criteria.

However, according to Berlin Hyp's ESG Bond Report 2024, of the company's total green finance portfolio (approximately €10.7 billion) at the end of 2023, only about 1.4% (approximately €147 million) was assessed as fully meeting the EU taxonomy criteria (Berlin Hyp AG, 2025, pp.6–7). This fact demonstrates that the technical screening criteria of the EU Taxonomy are extremely strict in practice, and highlights the importance of issuers establishing information gathering, analysis, and disclosure systems in order to comply with the system in the future.

Furthermore, the ECB has accepted sustainability-linked bonds aligned with the EU Taxonomy's environmental objectives as eligible collateral assets since January 1, 2021 (European Central Bank, 2020b). Moreover, the ECB is advancing a comprehensive strategic review to integrate climate change risks into monetary policy and financial supervision. Going forward, taxonomy compliance is likely to be more closely linked to the valuation of collateral assets and preferential treatment in asset purchase programs.

This means that institutional compliance with the taxonomy goes beyond mere ESG assessment and is linked to issuers' financing costs and real incentives in central bank operations, representing an important development that signals the expansion of its institutional and practical impact. Sustainable covered bonds that comply with the EU taxonomy are not merely a means of financing, but also have the characteristics of financial instruments that are institutionally consistent with EU green policies.

Their institutional legitimacy and policy significance are expected to increase further in the future, and compliance with the taxonomy is becoming an important evaluation criterion for both issuers and investors. However, in order to demonstrate compliance with the EU taxonomy, it is necessary to classify asset portfolios, confirm consistency with Technical Screening Criteria, third-party review by external reviewers, and the establishment of a continuous monitoring and reporting system (Regulation (EU) 2020/852, Articles 3, 19–26). While these requirements can provide a competitive advantage for large financial institutions by integrating with sustainability strategies and enhancing accountability to investors, they may pose significant burdens for smaller issuers. Complex classification tasks, disclosure requirements, and

external review costs could create barriers to market entry (European Commission, 2021a, pp.24–26).

However, the development process of the EU Taxonomy was not necessarily based solely on consistent scientific evidence. The institutional design relied heavily on the technical expertise of the Technical Expert Group (TEG) and the Platform on Sustainable Finance (PSF) established by the European Commission; nevertheless, the classification of energy sources, particularly nuclear power and natural gas, became the subject of intense political bargaining among member states. Ultimately, a compromise was reached through the "Complementary Climate Delegated Act," which allows nuclear power and natural gas to be recognized as taxonomy-compliant assets under specific conditions (European Commission, 2022, pp.1–9)[11]. However, this process raised doubts about the scientific integrity of the framework and the transparency of the policy-making process. Experts and civil society organizations strongly criticized the lack of scientific neutrality and the impact of political compromise.

Currently, the EU is advancing the introduction of the "Social Taxonomy" and the "Corporate Sustainability Reporting Directive (CSRD)" as complementary frameworks to the Taxonomy. The former is a system for systematically classifying and evaluating economic activities with social impact, such as education, healthcare, and welfare, and is considered highly compatible with the Social Covered Bond framework (Platform on Sustainable Finance, 2022, pp.54–55). The latter, CSRD, entered into force in January 2023, with phased implementation scheduled to begin in 2024 and beyond. Under the new system, all companies listed on regulated markets within the EU, large companies (whether listed or unlisted), and non-EU companies above a certain size will be required to disclose information on environmental, social, and governance (ESG) issues. This is expected to institutionalize ESG disclosure standards consistent with the EU Taxonomy (European Union (2022)).

Due to its advanced nature and comprehensiveness, the EU Taxonomy is regarded internationally as one of the most detailed sustainable finance classification systems. On the other hand, globally, systems that reflect the circumstances of each country and region, such as China's Green Bond Principles and the ICMA Green Bond Principles (GBP), among others. As a result, classification and information disclosure standards are not necessarily unified. Therefore, ensuring international consistency is an important issue for the future. The current situation, in which multiple systems coexist, undermines international comparability and interoperability, and as a result, may promote the risk of greenwashing.

Therefore, to ensure consistency between systems and enhance the reliability and consistency of sustainable finance, it is essential to establish a framework for international cooperation. From this perspective, efforts to harmonize standards by the International Sustainability Standards Board (ISSB) and cooperation through multilateral frameworks such as the G20 and the Network for Greening the Financial System (NGFS) are expected. Furthermore, against the backdrop of the EU Taxonomy and the expansion of sustainable finance markets, major central banks, including the ECB, are advancing efforts to incorporate climate-related risks into monetary policy through asset purchase strategies and the introduction of

climate stress tests. Notably, the NGFS is an international network comprising over 130 central banks and financial supervisory authorities, leading the international response to climate-related financial risks through ensuring financial stability and coordinating regulatory measures.

Considering these factors comprehensively, the EU Taxonomy is highly likely to establish itself as a global "reference taxonomy" in the future due to its institutional sophistication. While it plays a role in enhancing institutional credibility and transparency both within and outside the EU, challenges remain, including political compromises during its development, technical complexity, significant practical burdens on issuers, and the diversity of international standards. Going forward, its implementation will need to balance institutional harmonization with reducing practical burdens.

(3) Linkage with SDGs and Allocation of Collateral Assets

In recent years, the connectivity between sustainable covered bonds and the Sustainable Development Goals (SDGs) has been attracting attention in the context of sustainable finance.

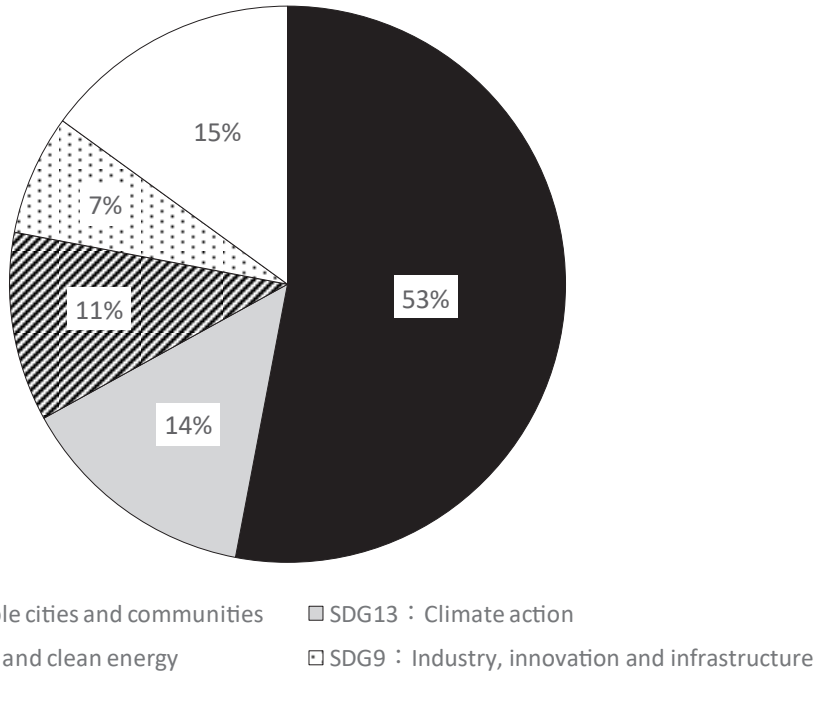
Particularly from the perspective of policy consistency in the EU, coordination with the EU Taxonomy and Green Bond Rules is progressing, and sustainable covered bonds are also playing a role in promoting the flow of funds to the SDGs through the management of eligible assets. Sustainable covered bonds are a stable and low-cost means of financing for issuers and a highly creditworthy financial product that investors can incorporate as part of their ESG investments.

In particular, as with conventional covered bonds, strict collateral management, dual recourse structures, and disclosure discipline are institutionally guaranteed, providing excellent transparency and traceability of fund usage, giving them a unique position compared to other sustainable bonds.

These characteristics enable not only the provision of funds, but also the visualization of the progress and results of individual projects, allowing for the evidence-based understanding and evaluation of positive environmental and social impacts. For this reason, sustainable covered bonds are relatively highly regarded in terms of their alignment with the SDGs. According to an analysis by S&P Global Rating, green covered bonds are highly aligned with SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action) because they are backed by assets such as energy-efficient buildings(S&P Global Ratings, 2022, p.3)[12].

In the practical development of sustainable covered bonds, since the majority of the underlying assets are mortgages and real estate loans, the main use of funds is for improving energy efficiency and urban sustainability. For example, the Green Pfandbrief issued by Berlin Hyp in 2014 was designed to invest in energy-efficient buildings in Germany, and since then, financial institutions in various countries have developed similar schemes[13].

Figure 5 shows the results of a survey of euro-denominated sustainable covered bonds issued by ECBC member financial institutions, indicating which SDGs the use of funds for each bond aligns with. According to the results, SDG 11 (Sustainable Cities and Communities)



Source: Adapted by the author from ECBC, 2024, p.45, Figure 8.

Figure 5. Allocation of Sustainable Covered Bond Proceeds by SDG Category

accounted for 53% of the total, followed by SDG 13 (Climate Action) at 14%, SDG 7 (Affordable and Clean Energy) at 11%, and SDG 9 (Industry, Innovation and Infrastructure) at 7%, with these four goals accounting for 85% of the total (ECBC, 2024, p.45).

This result reveals that the contribution of sustainable covered bonds to the SDGs is primarily concentrated in urban and living infrastructure, as well as energy efficiency improvements, underpinned by real estate collateral assets. Furthermore, this trend stems from the fact that it is institutionally determined by the alignment between the financial structure of covered bonds, which presupposes the existence of clear underlying assets, and the assessability of those underlying assets.

Conversely, funding allocation for social sectors such as education (SDG4), health (SDG3), and gender equality (SDG5) remains limited. This is partly due to the insufficient quantification of abstract social impacts and the lack of well-established methodologies for evaluating non-financial value, which also hinder the adoption of social covered bonds.

Going forward, progress in standardizing impact assessments, improving visualization technologies for non-financial information, and institutionally aligning the SDGs with the EU Taxonomy could expand the applicability of covered bonds in the social sector. While funding currently concentrates notably on specific areas centered around SDG 11, future development

of the institutional and technological foundations is expected to enable contributions to a broader range of SDG goals.

5. Discussion and Outlook

This paper analyzed the institutional structure and market trends of sustainable covered bonds, clarifying their significance and challenges as a financial product. First, after confirming the credit enhancement mechanisms and legal framework inherent in conventional covered bonds, we organized the institutional types of sustainable covered bonds, their issuance status, and their relationship with ESG factors. We also examined their structural and policy aspects, focusing on their institutional connection with the EU Taxonomy and their alignment with SDGs in fund allocation.

The results confirmed that sustainable covered bonds, as high-credit and highly transparent bonds, can become a strong option for ESG investment. Particularly for physical asset-based goals, including SDG 11 "Sustainable Cities and Communities," they possess institutional robustness distinct from other sustainable bonds, characterized by high institutional alignment and traceability. Conversely, challenges were identified, including regional concentration of issuance volumes, collateral asset concentration, non-uniformity in ESG evaluation methodologies, and underdeveloped secondary markets. This indicates that further institutional framework development is essential for the market's sustainable growth.

Moving forward, to further enhance the institutional coherence and market effectiveness of sustainable covered bonds, it is necessary to accumulate empirical insights on price formation and investor behavior, while also refining evaluation metrics that visualize the connectivity between collateral assets and the SDGs. Furthermore, comparing institutional frameworks across countries to identify complementary relationships and common foundations in design is expected to yield practical implications for the market's sound development. Particularly, advanced institutional arrangements are required to balance transparency and reliability in structuring diverse collateral assets, including those in the social sector, and in the associated assessment and disclosure of non-financial information.

Furthermore, standardizing ESG assessment methodologies, diversifying eligible cover pool assets, and designing systems to ensure secondary market depth are critical policy challenges for achieving both market reliability and scalability. Ensuring legal consistency to strengthen institutional connectivity with the EU Taxonomy, SFDR, and CBD, clarifying and unifying issuer disclosures, and achieving a balance between investor protection and market transparency are key to achieving medium-to-long-term institutional maturity.

Sustainable covered bonds have the potential to become a core infrastructure for sustainable finance in the future as a rare financial instrument that can simultaneously guarantee credit enhancement and sustainability through institutional means. The complementary relationship between their institutional characteristics and market functions allows them to play a unique role distinct from other green and social bonds, making them a valuable option for

meeting the diverse needs of sustainable finance. This paper presents a basic framework for the practical and theoretical understanding of sustainable covered bonds by clarifying their basic structure and institutional issues.

Going forward, based on the findings of this study, it will be necessary to present specific measures that achieve both institutional consistency and market effectiveness for sustainable covered bonds by promoting institutional design, market development, and policy responses in an integrated manner.

Notes

1) Ethical finance refers to financial actions based on ethical and moral values. Specific examples include negative screening to avoid involvement in environmental destruction or the military-industrial complex, and positive allocation of funds to socially and humanely beneficial sectors. Islamic finance based on religious norms, SRI, and impact investing may also be included within the broad context of ethical finance.
2) ECBC website (https://hypo.org/ecbc/about-us/)
3) The mortgage credit system was established in Copenhagen in 1797 to finance post-fire reconstruction.
4) Refers to a transaction structure where legal ownership of assets is fully transferred to a third party (typically a special purpose entity). In securitization, it is used to isolate collateral assets from the issuer's credit risk. Recognition of the transfer's genuineness is crucial for off-balance-sheet treatment and investor protection.
5) Countries such as Germany, France, the Nordic nations, and Canada have established statutory covered bond frameworks. These legally define the types of collateral assets, LTV caps, segregation requirements, and supervisory monitoring. For example, Germany's Pfandbrief Act and France's Modernization of Financial Activities Act clearly define issuer qualifications and asset management methods, ensuring high institutional transparency. In these countries, many issues maintain AA to AAA ratings and are evaluated as safe assets comparable to government bonds (ECBC (2024), pp.309–311, 345–362).
6) A dynamic pool refers to a structure where collateral assets can be replaced or added even after covered bond issuance. If collateral assets decrease due to amortization or repayment, or lose eligibility, they are supplemented with new assets.
7) Detailed information regarding the Covered Bond Label is specifically disclosed on the ECBC's official website (https://www.coveredbondlabel.com/). As of the end of 2024, over 100 programs from more than 30 countries are registered.
8) The official name is "Regulation (EU) 2020/852 of the European Parliament and of the Council." Commonly known as the EU Taxonomy Regulation.
9) The SFDR (Sustainable Finance Disclosure Regulation) is the EU's disclosure classification system for investment products. Article 8 funds are defined as "products promoting environmental and social characteristics (ESG characteristics)", while Article 9 funds are defined as "products aimed at sustainable investment".
10) The "six environmental objectives" refer to the following six categories: (1) climate change mitigation, (2) climate change adaptation, (3) sustainable use and conservation of water and marine resources, (4) transition

to a circular economy, (5) prevention and control of pollution, and (6) conservation and restoration of biodiversity and ecosystems.

11) The European Commission (2022) "Delegated Regulation (EU) 2022/1214: Complementary Climate Delegated Act" sparked debate when it conditionally recognized nuclear power and some natural gas as taxonomy-eligible assets. In particular, the Platform on Sustainable Finance (PSF), an advisory body to the European Commission, and civil society organizations such as WWF and Greenpeace expressed concerns about the lack of scientific neutrality and "greenwashing," criticizing that it undermines the credibility of the system (PSF (2022), Response to the Complementary Delegated Act).

12) S&P Global Ratings (2022) considers "energy-efficient buildings," which are collateral assets for green covered bonds, to be particularly consistent with SDG 11 and SDG 13 because they contribute to urban sustainability and greenhouse gas emission reduction.

13) Berlin Hyp's 2014 Green Pfandbrief is generally considered the first example of a sustainable covered bond, but at the time, it was not designed with the SDGs (adopted in 2015) in mind, and its main purpose was to comply with EU energy policy and building standards. Institutional linkage with the SDGs was established through developments in later years.

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Acknowledgments

This work was supported by the Kampo Foundation's FY2025 Research Grant and the Nihon University College

of Commerce Joint Research Grant.

（要旨）

本稿は，サステナブル・カバードボンドの制度構造と市場課題を体系的に整理し，EU タクソノミーとの接続性を手掛かりに，制度的成熟と市場発展の展望を提示するものである。まず，従来型カバードボンドの制度的特徴を確認した上で，サステナブル・カバードボンドの類型（グリーン，ソーシャル，サステナビリティ）と欧州における主要事例を整理した。次に，発行国の地域的集中，担保資産の偏在，ESG 評価の不統一性，セカンダリーマーケットの未成熟といった制度的・実務的課題を明らかにした。さらに，EU タクソノミーや SFDR との制度的連関を検討し，ESG 債としての情報開示の信頼性や担保資産のトレーサビリティに注目した。加えて，担保資産と SDGs との整合性を分析し，特に SDG11「住み続けられるまちづくり」への資金供給における構造的優位性を指摘した。以上を踏まえ，サステナブル・カバードボンドは ESG ファイナンスの中核的インフラとなり得るが，ESG 評価の標準化や市場流動性の確保など政策対応が不可欠であることを示した。