

Green bond market analysis, issuers conditions and individual investor perception

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Introduction

The capital market offers advantages for issuers not only bank loans, allows the companies to get other types of relation with investors through the bonds market, allowing better cash flow with middle or long terms debts and lower rates than banks, and for investors a better return with current rates that usually are higher than the savings account payment (Boshkoska, 2016).

Studies reflect that issuing bonds require the approval of regulatory institutions that give good reputational image for issuers, also those firms face lower cost of debt and are more profitable, because issuing bonds make them more stable, and provide better capital structure with long terms compromises and lower cost (Sheng, & Montgomery, 2023). For investors, bonds are interesting assets that allow them to have stability and diversify the risks they face in their investment portfolios (Yuthly, 2024). Bonds also “can reward investors with recurring interest payments for lending their money to an issuer for a stated period of time” (E*TRADE, 2025, p. 1).

The green bonds surge as an investment option that finances green projects or assets (Maltais & Nykvist, 2020), “corporate green bonds facilitate the reallocation of investment capital into research and development, effectively mitigating financial constraints on green innovation” (Dong et al., 2024, p.1). Green bonds are fixed-income assets that public or private institutions or companies can issue to finance projects related to the environment and the impact of climate change (Forest Yepez, 2023).

Some benefits according to Tan et al. (2022), include reducing information asymmetry between investors and issuers through third-party certification, supporting environmental impact with public policies, and enhancing the positive social image of issuers that back environmentally friendly projects. The return or yield is an important metric for investors “Adding green bonds to a conventional bond portfolio allows reserve managers to improve their reserves risk profile without sacrificing expected return” (Fender et al., 2020, par. 3).

Referring to the green certifications, “The ICMA Green Bond Principles are so-called “voluntary process guidelines” that outline general criteria that most certification schemes follow” (Ehlers, & Packer, 2017). “The Principles are a collection of voluntary frameworks with the stated mission and vision of promoting the role that global debt capital markets can play in financing progress towards environmental and social sustainability” (ICMA, n.d., p.2).

These Green Bond Principles (GBP) share the best practices for issuing bonds with social and environmental purposes to promote transparency and uphold market integrity. (GBP, n.d.). These principles together with Social Bond Principles (SBP), the Sustainability Bond Guidelines (SBG) and the Sustainability-Linked Bond Principles (SLBP) “raise awareness of the importance of environmental and social impact among financial market participants, which ultimately aims to attract more capital to support sustainable development” (ICMA, n.d., p.2).

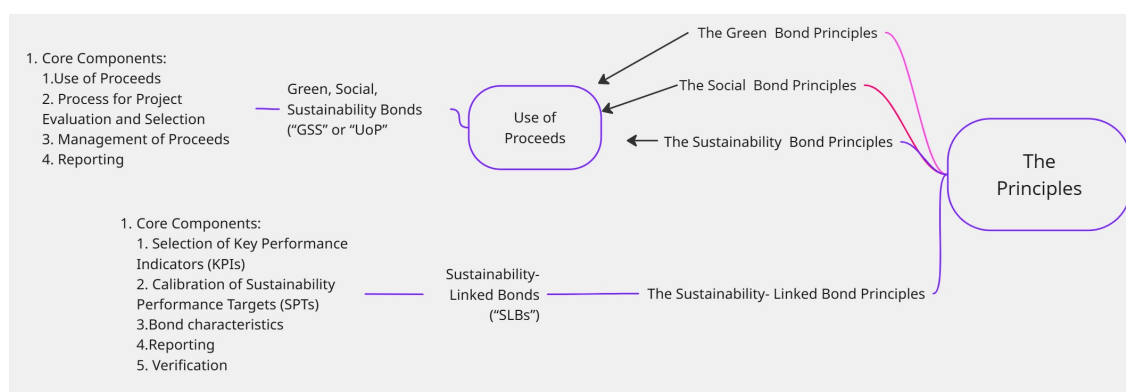
Figure 1. The Sustainability Bond Guidelines (SBG) from Green Bond Principles 2025.

Figure 1 illustrates the integration of these principles, focusing on four core components: From Use of proceeds to Reporting. For Sustainability-Linked Bond Principles, the core components include Selection of Key Performance Indicators (KPIs) to Verification (ICMA, 2025). These components provide market stakeholders with information about where the proceeds from bond issuance are allocated, outline the process for evaluating and selecting projects to support, detail the management of those proceeds, and present reports as best practices for market participants.

Green Bond Issuers

From the issuer side, there are benefits of green bonds, like the reputational impact of the company "Renewable energy projects would earn exceptional public visibility and build a brand reputation. Companies with high social responsibility and environmental consciousness tend to issue green bonds in favor of green development" (Tan et al., 2022, par. 5). And for the verification of the goals of these bonds:

Looking directly at emissions data provides a simple, transparent and cost-efficient way to verify whether corporates are on track to achieve any stated carbon emission goals. This could complement other efforts to require green bond issuers to publish standardized impact reports, which could include achieved (or expected) carbon reductions (Ehlers et al., 2020, p.32).

Bond issuance in countries like China requires approval from financial regulatory authorities and the successful issuers get a good reputational signal at the market. Also, firms with higher bond debt levels have more profit according to ROA and ROE measurements and face a lower cost of debt (Sheng, & Montgomery, 2023). Third-party certification is a key governance mechanism for green bonds; these certifications help the green bond issuer get better response from market to the announcement of the issues and experience both financial and environmental performance (Flammer, 2020).

The GBP, "provide complementary definitions, standards and taxonomies for determining the environmental sustainability of projects" (GBP, n.d. p. 2), They engage in a collaborative and consultative process with contributions from all members and observers, in accordance with the development of the current Green Bond Market. The GBP "provide issuers with guidance on the key components involved in launching a credible Green Bond" (GBP, n.d., p. 4). Different stakeholders present relevant information for the analysis of green initiatives, some of the sources are restricted or paid information, but there are other free and open sources with pertinent information:

Climate Bonds is the leading international non-governmental organisation mobilizing global capital for climate action. We drive the growth of the green and sustainable debt market through science-aligned frameworks including our taxonomies and standards, our Certification, our data and insights, and our provision of expert policy and technical advice. (Climate Bonds, n.d., p. 1).

According to Insights from Climate Bonds Data – Issuer Type over the past year, shows the types of issuers and the amounts in USD billions, providing a global overview as well as specific insights for developed, emerging, and supranational markets. This data identifies the relevant issuer amounts and types along with the total issues over the seven months covered. The total amount issued in this period is 255.602 USD billion, with more weight issued in September with 26.14%, November 20.19% and October 19.75%. The use of proceeds for the same period into the nine categories presented, the weighted average of the use reflects that the main category is Energy with 33.28%, followed by Buildings and Transport with 20.72% and 19.19%, and the less representative are Adaptation, Information and Communication Technology and Industry with 3.78%, 3.62% and 2.22% respectively.

Green Bond Investors

Green Bonds offer the investor the opportunity to fund green projects, help initiatives to mitigate climate change, and invest in projects that generate environmental benefits (Bachelet *et al.*, 2019). The corporate green bond market growth reflects that the companies can be more competitive integrating shareholders' expectations related to environmental responsibility and sustainability management (Badía *et al.*, 2024). The GBP cited before "aid investors by promoting availability of information necessary to evaluate the environmental impact of their Green Bond investments" (GBP, n.d. p.4).

The increasing interest in these investment assets is reflected (NextGenerationEU, n.d.) In October 2021, the European Commission issued the "NextGenerationEU green bond" with a demand of 11 times for the 15-year bond that exceeded 135 billion euros. The Benefits for investors have been studied in some research like (Martiradonna *et al.*, 2023) where analyzing portfolio allocation strategies they found that the exposition to risk in green portfolios are preferred for investor than non-green portfolios and presented better performance in bear period of market and positive but lower returns in a bull market.

Figure 2. Value of green bonds issued worldwide from 2014 to 2023– Statista

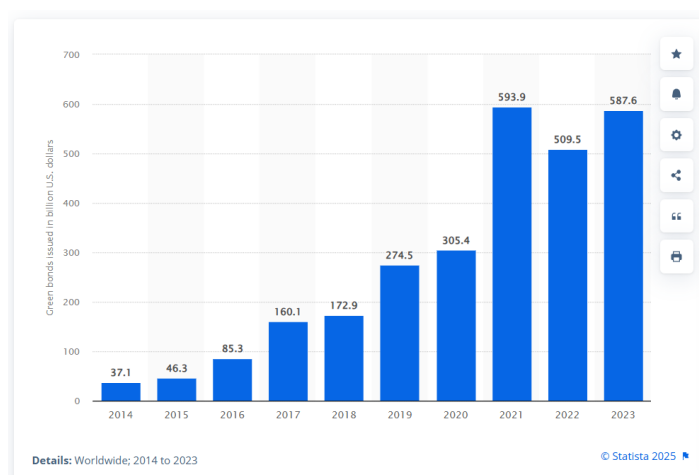


Figure 2 generated by Statista (Green Bonds Issued Worldwide 2014-2023, n.d.) verified the increasing interest of investors for green bond issuance, with an amount issued in USD billion; from 37.1 billion in 2014 to 823% growth till 2020 with levels around 305, and with the last 3 years above 500 billion in 2021-2023, the maximum amount issued in 2021 with 593.9 USD billions.

About profit valuation "The evidence suggests that investors place value on the green label at issuance, even though the post-issuance financial performance of green bonds is comparable with that of conventional bonds" (Ehlers, & Packer, 2017, p. 13). (Bachelet *et al.*, 2019, p. 16) show that "Institutional green bonds display a negative premium and are far more liquid, whereas private green bonds have a positive premium and a much narrower liquidity advantage".

From investors perspective and the available securities options about green bonds, “Bloomberg provides adequate information about corporate bonds, including announcement date, issue amount, coupon, and maturity, that can be missing from the CBI data. Such data are important for our event study analysis” (Tang, & Zhang, 2020, p. 1).

The global green bond market is represented by two indices: the Bloomberg Barclays MSCI Green Bond Index (BBGB) and the Solactive Green Bond Index (SOLGB). Both are in line with the Climate Bond Taxonomy, a guide to climate-aligned assets and projects developed by the Climate Bonds Initiative, and have been introduced (Martiradonna et al., 2023, p. 2).

Bloomberg Barclays MSCI Green Bond Index (Morgan Stanley Capital International [MSCI], n.d., p.1) “Offers investors an objective and robust measure of the global market for fixed income securities issued to fund projects with direct environmental benefits”, It was created in 2014, includes corporate and government-related bonds, rated investment grade by major credit rating agencies, with a fixed minimum issue size and “securities are independently evaluated by MSCI ESG Research along four dimensions to determine whether they should be classified as a green bond” (MSCI, n.d., p. 3).

This index has “6 eligible environmental categories defined by MSCI ESG Research that are: Alternative Energy, Energy Efficiency, Pollution Prevention and Control, Sustainable Water, Green Building and Climate Adaptation” (MSCI, n.d., p. 3). The project selection criteria should be specific to fit into the index and contemplate eligible mechanisms to ring-fence net proceeds.

Solactive Green Bond Index (Solactive, 2025, p. 1) “is a rules-based, market value weighted index engineered to mirror the green bond market. The index is calculated as a Total Return Index denominated in USD”. This index is composed of 2.815 entities with different coupons and maturity, the most relevant by weighting are Government of United Kingdom maturity of July 2033, Government of France maturity of June 2039, European Union maturity of February 2050 and Government of Italy maturity of October 2037 with 1.93%, 1.58%, 0.86% and 0.80% respectively, together represent 5.17% of the index.

This research is constructed by combining academic and financial knowledge with open financial sources of information, providing past and current insights into the green bond market. Since the beginning of relevant issuances in 2014, the growth has been evident, reflecting an increasing interest in this type of security. From investor side, it was an analysis about current sources of information to get into the market and the available options for valuation of the green bonds.

The insights from Climate Bonds Data about weighted Average amount per Issuer type; shows a weighted average of the amount issue according to the month relevance and the amount of the issuer, in this period the most representative issuer is the Non- Financial Corporate with 27.10%, followed by Financial Corporate with 24.42% and in the third position Government-Backed Entity with 21.38%, in the other side, the less representative is the Local Government with 2.03% of the amount issued. In this data, the amount issued by Corporates represents 51.52% and for public entities it is 38.13% of the total green bonds.

According to Zhang (2024), In China, public-private energy partnerships show cooperation between government institutions and private initiatives to involve themselves in projects like renewable energy, energy efficiency, and low-carbon infrastructure projects.

Checking the information available from (Insights from Climate Bonds Data, n.d.) in the past 12 months the issuance by country shows the more relevant resources in billions at global level were United States of America 32.8, China 32.7, and Germany 26.3, in the Latin America Region the order of relevance it's in the first place Brazil with 1.7, followed by Chile 0.4, Mexico 0.3 and Colombia with 0.2. The (Global Investments in Clean Tech, n.d.) generated by Statista, indicate the distribution of investments in clean energy in 2025, it is leading by China with 29%, and together with The European Union and United states of America represent 66% of the total investment, the Latin America region and the

Caribbean contribute with 3% of the resources.

About the Bloomberg Barclays MSCI Green Bond Index and Solactive Green Bond Index performance over time, (Bloomberg Barclays MSCI Global Green Bond Index, 2023) presents a chart from 2015 from an initial level of 95, and a bullish trend till the maximum level of 121.91 in 2020 a growth of 28.32% , and two following years going down to 86.94 even below the initial level, that has been recovered to 2023 with 96.09. The Solactive Green Bond Index chart reflects a first level of 993.78 in 2014, a bullish trend until the maximum level of 1158.34 in 2021, with a growth of 16.56%. The trend then shifted to bearish, reaching the minimum level of 778.88 in 2022. The last recorded level was 1020.95 as of 03/07/2025. Both indexes had a 2022 going down but also a post recovery (Solactive, 2025).

Investors analysis

In a specific search of “green bond” in the bar of some open-access sources of information (Bloomberg, n.d.) the following securities with available information; Bloomberg MSCI Global Green Bond Index Total Return Index Value Unhedge (GBGLTRUU:IND), Bloomberg MSCI European Green Bond Issuer Capped EUR Index (I33869:IND), Bloomberg Global Aggregate EUR Green Bond Index Unh EUR (I37379EU:IND), Bloomberg MSCI Global Green Bond Index (I31572:IND) and JPMorgan Common Ground Taxonomy Green Bond Fund (JCGTBFC:CH), it presents 4 index on green bonds, the first 3 in Europe , the other its global level and there is a fifth security from JP Morgan that it's a fund compose by green bonds. But for specific information in this case, you must get a subscription.

The same search for “green bond” by (CNBC, n.d.) presents, VanEck Green Bond ETF (GRNB), iShares USD Green Bond ETF (BGRN), Franklin Municipal Green Bond ETF (FLMB), Nuveen Green Bond Fund (A) (TGROX) and Nuveen Green Bond Fund (I) (TGRKX), in this case there are 3 ETFs, and 2 Funds compose by green bonds. And (Yahoo finance, n.d.) the following, Franklin Sustainable Euro Green Bond UCITS ETF (FLRG.DE), Xtrackers EUR Corporate Green Bond UCITS ETF 1C (XGBE.MI), Amundi Euro Government Green Bond UCITS ETF Acc (ERTH.MI), Amundi Global Aggregate Green Bond UCITS ETF Acc (CLIM.MI), Goldman Sachs Green Bond-X Cap EUR (OP0001IT87.F), and BNP Paribas Green Bond K (OP0001KT7A.F) in this case there are 4 ETFs, and 2 Funds compose by green bonds.

Conclusions

Analyzing green bonds reveals first some limitations regarding the availability of information in this relatively new market. Second, research indicates that the primary issuers are concentrated in major markets such as the United States, China, and the European Union, while participation is lower in regions like Latin America. Issuers include both corporate and public institutions, reflecting a widespread interest in sustainable investment options. This interest is primarily focused on green projects related to energy, buildings, transportation, and improvements in various industries.

Third, for investors the available options are mainly directed toward institutional investors, who have larger resources to participate in the green bond market, primarily through exchange-traded funds (ETFs) and other funds. These funds can later be traded on the secondary market, offering diversification in terms of issues and maturities. However, this structure limits investment options for individual traders, which affects the valuation of each bond and issuer. The performance of these bonds is largely determined by the composition of the index. A significant challenge remains in developing a deeper secondary market that would allow for greater liquidity and more opportunities for broader participation in supporting green initiatives.

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