# GREEN BONDS - INSTRUMENTS FOR SUPPORTING GREEN INVESTMENTS ON THE CAPITAL MARKET

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**ABSTRACT:** *The awareness of the challenges of climate change at the global level have recently determined new approaches from a social, economic and environmental point of view. The principles of sustainable development impose organizations to transition to strategies and business models that have a positive impact and that meet Environmental, Social, and Governance (ESG) objectives. But such a transition requires an investment effort that public money and traditional funding through bank lending alone cannot deliver. This is where the capital market comes in, and investors on that market are increasingly aware of the power they have in supporting green initiatives, and for this a new financial instrument was created, i.e., the green bond. In this paper, we will present the general principles and guidelines developed by different countries and international bodies from the moment of the first green bond issue until now, but also an analysis of dynamics and structure of this financial instrument's issue on the global capital market.*

**KEY WORDS:** *green initiatives, green bonds, green investments, sustainable finance, capital market, ESG objectives*

**JEL CLASSIFICATIONS:** *O16, Q01, Q50*

## 1. INTRODUCTION

The available information places the idea of issuing green bonds very recently, only 15 years ago, in Sweden. Thus, in 2007, a group of Swedish pension funds wanted to invest in projects that help the climate, but they did not know how to find these projects. The group's motivation was based on a report published that year by the Intergovernmental Panel for Climate Change - a United Nations agency, which provided concrete data on the impact of climate change and natural disasters on society and the economy.

The road from the idea to its realization was very short, and the steps actually represented a series of phone calls, which followed one another as follows: the

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Swedish group initially called its bank; the bank addressed the World Bank, which, in turn, called CICERO, the Center for International Climate and Environmental Research— an interdisciplinary research center for climate research in Oslo. Thus, a link was created between the scientists and experts of these institutions and bodies, who in the following period sought the answer to a key question: ”how could investors be truly certain that the projects they were supporting addressed climate concerns?” (Word Bank, 2019). This is because in recent decades, environmental problems, but especially the initiatives regarding the reduction and elimination of these phenomena that affect society and the economy, have led investors on the capital market to be more aware and careful with their investments, making more and more decisions based on the impact that the companies and projects in which they invest have in sustainable development.

The answer to the above question was embodied in an innovative model that laid the foundations of the new financial instrument, namely: the selection of environment-friendly projects to be financed through these green bonds, the appeal in the decision process to a second approved opinion and not lastly, reporting the impact that the project had in achieving the Environmental, Social, and Governance objectives (ESG) (Bhutta et al., 2021). What is remarkable and important to emphasize is the fact that this collaboration between investors, banks, development agencies and scientists also represented a model in itself and set an example to follow.

Thus, in November 2008 the World Bank issued the first green bond, a 2.3 SEK billion bond with a maturity of six years for a group of Scandinavian investors (IFC, 2016).

In this paper we will first present the concept of the green bond as a new instrument on the capital market as well as the evolution of the main principles and guidelines that underlie its use and that have been developed in recent years by different countries and bodies. The second part of the paper will take the form of an analysis of the dynamics and structure of investments in green bonds on the international capital market.

## 2. GREEN BOND – DEFINITION, PRINCIPLES AND STANDARDS

International Finance Corporation (IFC) – the World Bank Group’s institution focused on the private sector – has played a key role in launching and building the world’s green bond market, moving from operating as an issuer of green bonds to also being an investor. Thus, IFC defines green bonds as "financial instruments that finance green projects and provide investors with regular or fixed income payments" (Word Bank, 2021).

Green bonds are fundamentally the same as conventional bonds: a loan made by an investor to an organization to finance a project, with the investor receiving the principal amount at the end of the loan’s life, in addition to interest payments (depending on the loan terms) throughout the loan’s term (CFI, 2022).

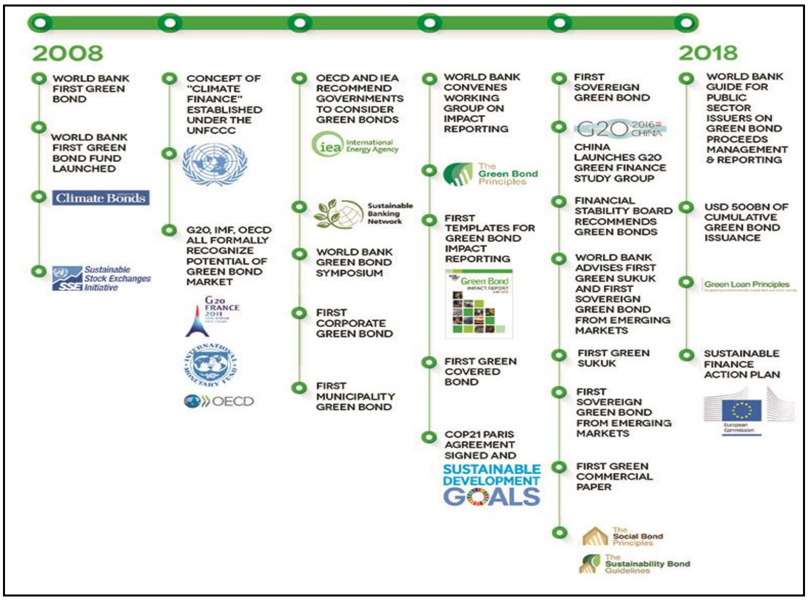
And other definitions give green bond the same meaning, this being ”a type of fixed-income instrument that is specifically earmarked to raise money for climate and environmental projects” (Investopedia, 2022).

If from the point of view of the concept, opinions are united, the same cannot be said when considering the similarity or difference between green bonds and other instruments issued on the capital market. Thus, the Corporate Finance Institute considers that "a green bond is alternatively known as a climate bond" (CFI, 2022).

At the opposite pole are the experts who state that “green bonds are sometimes referred to as climate bonds, but the two terms are not always synonymous. Climate bonds specifically finance projects that reduce carbon emissions or alleviate the effects of climate change, while green bonds represent a broader category of instruments related to projects with a positive environmental impact” (Investopedia, 2022). In this context, it should be emphasized that before the World Bank, in 2007, the European Investment Bank (EIB) issued its inaugural Climate Awareness Bond (CAB), considered at the European level as *the world's first green bond*.

However, the June 2022 definition of the International Capital Market Association (ICMA) included in the Green Bond Principles document. Voluntary Process Guidelines for Issuing Green Bonds point out that "Green Bonds are any type of bond instrument where the proceeds or an equivalent amount will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible Green Projects and which are aligned with the four core components of the GBP" (ICMA, 2022b).

But beyond its definition, the new instrument developed by the World Bank has drawn the attention of international bodies and institutions, public and private issuers to its potential in the capital market. Thus, within only 10 years (Figure 1), a series of premieres succeeded one another, which gave a considerable boost to the green bonds market worldwide.




*Source: Word Bank, 2019*

**Figure 1. Green bond time line 2008-2018**

Also, recently, several countries and bodies have opted to regulate the green bond market with issuance guidelines. But this is not enough. Standards and general principles are needed for the good use of this instrument, as well as the main types that can be issued on the capital market. In recent years, a number of general principles and certification programs have been developed, of which the most used currently are the Green Bond Principles and the Climate Bond Standards.

An important role was played by ICMA, which, together with its members, have worked for the last 50 years to promote the development of the international capital and securities markets, pioneering the rules, principles and recommendations which have laid the foundations for their successful operation. ICMA brings together members through regional and sectoral committees focusing on a comprehensive range of market practice and regulatory issues, prioritizing sustainable finance and three core fixed income market areas: primary; secondary; repo and collateral. So, his involvement in the development of guidelines related to a new financial instrument was more than welcome (ICMA, 2022a).

We will present all these briefly in the following.

There are currently **four types of Green Bonds** (additional types may emerge as the market develops and will be incorporated in GBP updates) (ICMA, 2022b):

1. ***Standard Green Use of Proceeds Bond***: an unsecured debt obligation with full recourse-to-the-issuer only and aligned with the GBP.

2. ***Green Revenue Bond***: a non-recourse-to-the-issuer debt obligation aligned with the GBP in which the credit exposure in the bond is to the pledged cash flows of the revenue streams, fees, taxes etc., and whose use of proceeds go to related or unrelated Green Project(s).

3. ***Green Project Bond***: a project bond for a single or multiple Green Project(s) for which the investor has direct exposure to the risk of the project(s) with or without potential recourse to the issuer, and that is aligned with the GBP.

4. ***Secured Green Bond***: a secured bond where the net proceeds will be exclusively applied to finance or refinance either:

• The Green Project(s) securing the specific bond only (a "Secured Green Collateral Bond"); or

• The Green Project(s) of the issuer, originator or sponsor, where such Green Projects may or may not be securing the specific bond in whole or in part (a "Secured Green Standard Bond"). A Secured Green Standard Bond may be a specific class or tranche of a larger transaction.

**The Green Bond Principles (GBP)** are voluntary process guidelines that recommend transparency and disclosure and promote integrity in the development of the Green Bond market by clarifying the approach for issuance of a Green Bond. The GBP recommend a clear process and disclosure for issuers, which investors, banks, underwriters, arrangers, placement agents and others may use to understand the characteristics of any given Green Bond.

The four core components for alignment with the GBP are (ICMA, 2022b):

**1. Use of Proceeds** - the utilisation of the proceeds of the bond for eligible Green Projects, which should be appropriately described in the legal documentation of the security. All designated eligible Green Projects should provide clear environmental benefits, which will be assessed and, where feasible, quantified by the issuer.

The ***eligible Green Projects categories***, listed in no specific order, include, but are not limited to:

• *Renewable energy* (including production, transmission, appliances and products);

• *Energy efficiency* (such as in new and refurbished buildings, energy storage, district heating, smart grids, appliances and products);

• *Pollution prevention and control* (including reduction of air emissions, greenhouse gas control, soil remediation, waste prevention, waste reduction, waste recycling and energy/ emission-efficient waste to energy);

• *Environmentally sustainable management of living natural resources and land use* (including environmentally sustainable agriculture; environmentally sustainable animal husbandry; climate smart farm inputs such as biological crop protection or drip-irrigation; environmentally sustainable fishery and aquaculture; environmentally sustainable forestry, including afforestation or reforestation, and preservation or restoration of natural landscapes);

• *Terrestrial and aquatic biodiversity conservation* (including the protection of coastal, marine and watershed environments);

• *Clean transportation* (such as electric, hybrid, public, rail, non-motorised, multi-modal transportation, infrastructure for clean energy vehicles and reduction of harmful emissions);

• *Sustainable water and wastewater management* (including sustainable infrastructure for clean and/or drinking water, wastewater treatment, sustainable urban drainage systems and river training and other forms of flooding mitigation);

• *Climate change adaptation* (including efforts to make infrastructure more resilient to impacts of climate change, as well as information support systems, such as climate observation and early warning systems);

• *Circular economy adapted products, production technologies and processes* (such as the design and introduction of reusable, recyclable and refurbished materials, components and products; circular tools and services); and/or certified eco-efficient products;

• *Green buildings* that meet regional, national or internationally recognised standards or certifications for environmental performance.

**2. Process for Project Evaluation and Selection -** The issuer of a Green Bond should clearly communicate to investors:

• The environmental sustainability objectives of the eligible Green Projects;

• The process by which the issuer determines how the projects fit within the eligible Green Projects categories (examples are identified above); and

• Complementary information on processes by which the issuer identifies and manages perceived social and environmental risks associated with the relevant project(s).

**3. Management of Proceeds** - The net proceeds of the Green Bond, or an amount equal to these net proceeds, should be credited to a sub-account, moved to a sub-portfolio or otherwise tracked by the issuer in an appropriate manner, and attested to by the issuer in a formal internal process linked to the issuer's lending and investment operations for eligible Green Projects. So long as the Green Bond is outstanding, the balance of the tracked net proceeds should be periodically adjusted to match allocations to eligible Green Projects made during that period. The issuer should make known to investors the intended types of temporary placement for the balance of unallocated net proceeds. The proceeds of Green Bonds can be managed per bond (bond-by-bond approach) or on an aggregated basis for multiple green bonds (portfolio approach).

**4. Reporting -** issuers should make, and keep, readily available up to date information on the use of proceeds to be renewed annually until full allocation, and on a timely basis in case of material developments. The annual report should include a list of the projects to which Green Bond proceeds have been allocated, as well as a brief description of the projects, the amounts allocated, and their expected impact. Transparency is of particular value in communicating the expected and/or achieved impact of projects. The GBP recommend the use of qualitative performance indicators and, where feasible, quantitative performance measures and disclosure of the key underlying methodology and/or assumptions used in the quantitative determination. Issuers should refer to and adopt, where possible, the guidance and impact reporting templates provided in the *Harmonised Framework for Impact Reporting*.

The key recommendations for heightened transparency are:

- ***Green Bond Frameworks*** **-** It is recommended that issuers summarise in their Green Bond Framework relevant information within the context of the issuer's overarching sustainability strategy. This may include reference to the five high level environmental objectives of the GBP (climate change mitigation, climate change adaptation, natural resource conservation, biodiversity conservation, and pollution prevention and control). Issuers are also encouraged to disclose any taxonomies, green standards or certifications referenced in project selection.
- ***External Reviews*** **-** It is recommended that issuers appoint (an) external review provider(s) to assess through a pre-issuance external review the alignment of their Green Bond or Green Bond programme and/ or Framework with the four core components of the GBP (i.e. Use of Proceeds, Process for Project Evaluation and Selection, Management of Proceeds and Reporting) as defined above. Post issuance, it is recommended that an issuer's management of proceeds be supplemented by the use of an external auditor, or other third party, to verify the internal tracking and the allocation of funds from the Green Bond proceeds to eligible Green Projects.

Also, another document developed by ICMA aims to provide a broad frame of reference by which issuers, investors, underwriters and other bond market participants can relate and evaluate the benefits and contribution of the GBP's Green Project categories to its own stated five environmental objectives (i.e. Climate Change Mitigation, Climate Change Adaptation, Natural Resource Conservation, Biodiversity Conservation, and Pollution Prevention and Control). It also provides a basis for comparison to other green taxonomies and classification systems currently used in the market. This frame took the form of a mapping of GBP-eligible project categories to GBP environmental objectives based on their most commonly observed contributions (Figure 2) (ICMA, 2021).

Thus, the contribution of different categories of projects to the achievement of environmental objectives can be considered primary, secondary or tertiary.

| GBP - Environmental objectives | | | | | |
|---|---|---|---|---|---|
| GBP-project categories | Climate change mitigation | Climate change adaptation | Biodiversity | Natural resource conservation | Pollution prevention and control |
| Renewable energy | ●●● | | | ● | ● |
| Energy efficiency | ●●● | | | | ● |
| Pollution prevention and control projects | | | | ● | ●●● |
| Environmentally sustainable management of living natural resources and land use | ● | ●● | ●●● | ●●● | |
| Terrestrial and aquatic biodiversity conservation projects | | ● | ●●● | ●●● | |
| Clean transportation | ●●● | | | ● | ●●● |
| Sustainable water and waste water management | | ●● | ●● | ●● | ●●● |
| Climate change adaptation projects | | ●●● | | | |
| Eco-efficient and/or circular economy adapted products, production technologies and processes | ●● | | ● | ●●● | ● |
| Green buildings | ●●● | ● | | ●●● | ● |

Contribution to objective:

primary ●●● secondary ●● tertiary ●

*Source: ICMA, 2021, p. 4*

**Figure 2. Mapping of the GBP-project categories to GBP-environmental objectives**

We have stated only a few examples of guidelines developed so far, which are open, as we could see, to new elements that can modify or supplement the operating framework regarding the issuance of green bonds as situations arise that require new approaches. But an international regulatory framework is still needed.

At the regional level, the European Commission published a proposal for a Regulation on European green bonds (EU GBS) in July 2021 as part of its agenda on sustainable finance to meet the goals of the Paris Agreement and the European Green Deal. But, until this moment, the Regulation has not been adopted, the issue of green bonds within the EU still being guided by the Climate Bond Initiative's (CBI) Climate Bond Standard (Chance, 2022).

## 3. THE EVOLUTION AND THE STRUCTURE OF THE GLOBAL GREEN BONDS CAPITAL MARKET

The public information and data available on the web pages of specialized bodies indicate a timid start to the green bond issue. Thus, at the level of 2012, green bond issuance amounted to only 2.6 billion USD. But in 2016, green bonds began to sprout. Much of the action was attributable to Chinese borrowers, who accounted for 32.9 billion USD of the total, or more than one-third of all issuances. But the interest is global, the European Union and the United States among being the leaders, too.

In 2017, green bond issuance soared to a record high, accounting for 161 billion USD worth of investment worldwide. Growth slowed a bit in 2018, hitting only 167 billion USD, but rebounded the following year thanks to an increasingly climate-aware market. Green issuances reached a record 266.5 billion USD in 2019 and nearly 270 billion USD the following year.

The World Bank is a major issuer of green bonds and issued 14.4 billion USD of green bonds from 2008 through 2020. These funds have been used to support 111 projects around the world, largely in renewable energy and efficiency (33%), clean transportation (27%), and agriculture and land use (15%) (Investopedia, 2022).

The Climate Bonds Initiative (CBI) classifies all bonds that aim to meet environmental and social objectives and commit funds to programs, projects or assets that are deemed environmentally and/or socially beneficial (Hussain F.I., 2022), as thematic labeled bonds. These are green, social, sustainability, sustainability-linked, and transition (GSS+) labeled bonds (Figure 3).

| Theme | | Label | Format |
|---|---|---|---|
| GSS+ | GSS | Green | Use of proceeds |
| | | Social | Use of proceeds |
| | | Sustainability | Use of proceeds |
| | Transition | Sustainability-linked | Entity KPI-linked |
| | | Transition | Use of proceeds |

*Source: CBI, 2021, p. 1*

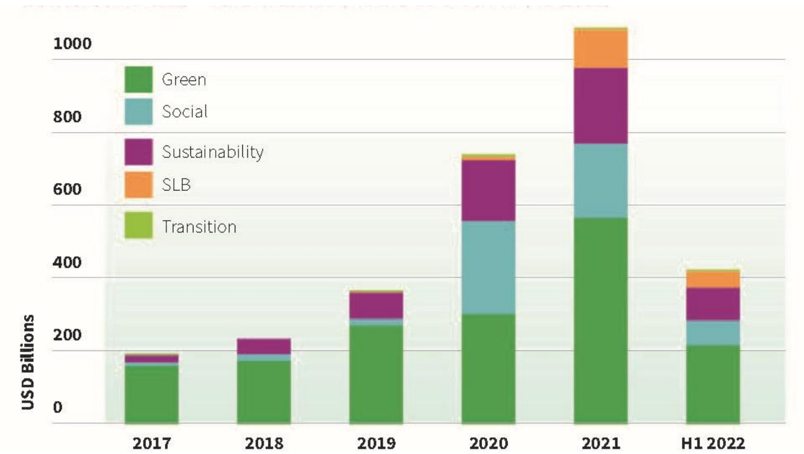
**Figure 3. Sustainable fixed income market**

The latest data included in the CBI Reports (CBI, 2022a) shows that half-yearly GSS+ volumes reached in 2022 417.8 billion USD, which represents a year-on-year decrease of 27% against H1 2021. However, January 2022 was the most prolific month (108.4 billion USD) in H1, representing a 74% year-on-year increase.

In terms of dynamics, as can be seen in Figure 4, during the period 2017-2021 the volume of green bonds issued had a significant and growing share in the total GSS in the first three years. But, starting from 2020, there is an important increase in the volume of social and sustainability bonds, while the green ones maintain a low growth rate. The situation changes in 2021 when the volume of green bonds doubles compared to two years ago, i.e. 2019.

In H1 2022, green-themed issuance accounted for 52% of the H1 GSS+ labelled debt with sustainability and social bonds at 21% and 15%, respectively (Figure 5). In H1 2022 new green debt instruments recorded in the Climate Bonds Green Bond Database (GBDB) totalled 218.1 billion USD, a 21% drop compared to the record H1 volumes of 277.5 billion USD in 2021. This was not unexpected, given post COVID-

19 inflation concerns and broader market volatility following the Russian invasion of Ukraine.



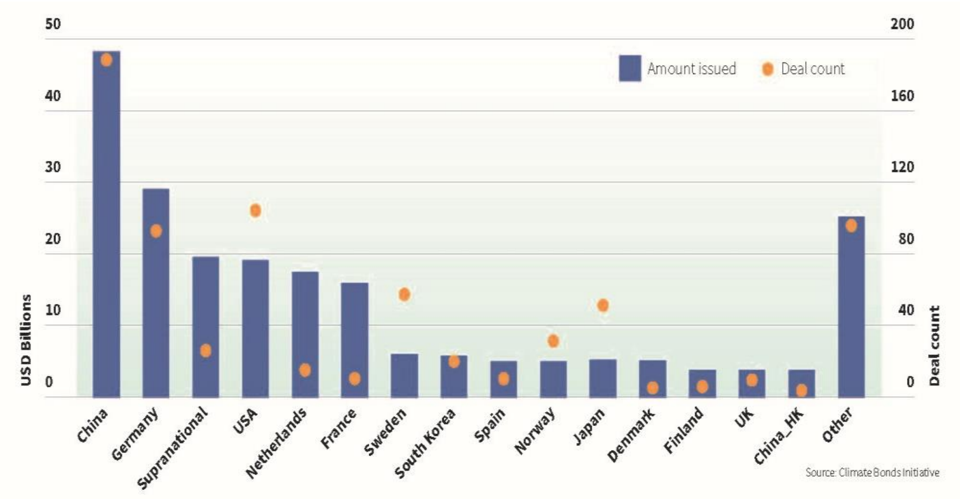

*Source: CBI, 2022a, p. 1*

**Figure 4. Cumulative GSS+ volumes**


*Source: CBI, 2022a, p. 1*

**Figure 5. GSS+ volumes reached in H1 2022**

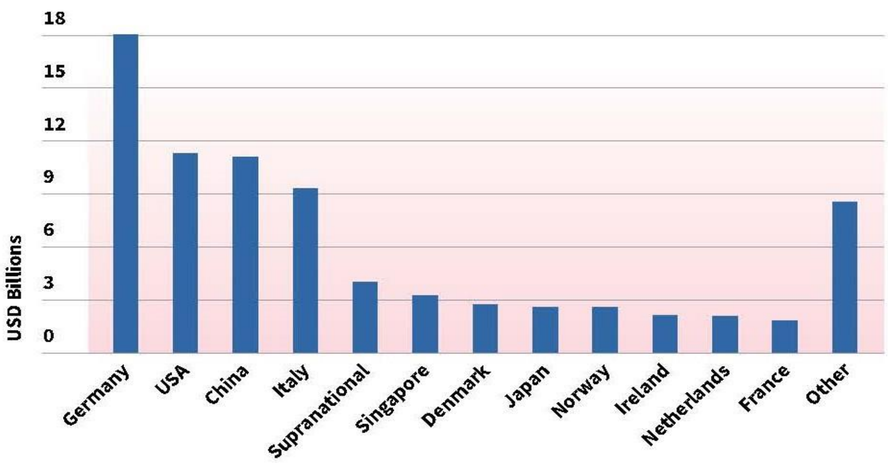
Also in H1 2022, developed markets (DM) continued to generate the largest share of green debt, with over 60% of total issuance. Emerging markets (EM) accounted for a larger share of green-themed issuance in the first half of 2022 (29%) vis-à-vis H1 2021 (20%). Issuance from supranationals (SNAT) of 19.6 billion USD registered the most impressive increase (up 75% from H1 2021). In Europe there was a 31% drop from H1 2021, but constituted almost half of the green segment (101.5 billion USD or 47%). As we can observe from Figure 6, China was the most prolific country by volume (48.2 billion USD, or 22% of the total), wirh a deal count of 190 deals and 116 issuers. All three indicators have increased compared to 2021, with total amount issued up by 63%, number of green bond issuers up by 59% and deal count by 64% (CBI, 2022a).




*Source: CBI, 2022a, p. 3*

**Figure 6. The largest sources of green bonds in H1 2022**

But the permanent changes occurring on the capital market can be highlighted with the help of the latest available data of the GBDB which shows (Figure 7) that in Q3 2022 Germany was the largest source of green bonds (which includes the country's fifth sovereign green bond), responsible for 18% of the total. USA and China took the next two spots, with around 11% each.




*Source: CBI, 2022b, p. 4*

**Figure 7. The largest sources of green bonds in Q3 2022**

It is important to state that in Q3 2022 the predicted threshold for this year was reached, the cumulative issue of green bonds being 2 trillion USD.

Also, in 2022, by the end of the 3rd quarter the issue of green bonds reached 332.5 billion USD, but compared to the value of 427.7 billion USD recorded at the same time in 2021, it represents a decrease of 22%. Also compared to the previous year, the value recorded only in Q3 2022 of USD 79.4 billion is 46% lower than in Q3 2021.

Green bonds were issued in 19 currencies in Q3 2022. More than half of the volumes (53%) were issued in EUR, followed by USD (20%) and CNY (14%) (CBI, 2022b).

## 4. CONCLUSIONS

The capital market has a very important role in economic development. It is also a dynamic and complex system, which has evolved over time with the changes that have occurred at the micro and macroeconomic level. Thus, public and private issuers sought to attract the funds they needed through various financial instruments as attractive as possible to potential investors and issued on the capital market.

The environmental and climate problems that our planet is currently facing have determined increasingly strong reactions, materialized in initiatives that have penciled in the objectives of a sustainable change at the global level and that are wanted to be achieved in the next decades.

But developing sustainable businesses (Dobre-Baron, 2015) and transitioning national economies to a new model requires a major investment effort. Issuing bonds on the capital market was and is an effective way to raise the necessary funds. But the new green programs and projects needed a tool to guarantee investors that their money would support environmental initiatives (Dobre-Baron & Nițescu, 2017) and at the same time bring them financial gains. The green bond was thus created, a financial instrument that proved attractive and caused a positive reaction at the international level. The boom in these bonds created a distinct segment in the capital market and necessitated regulation of its functioning. Even if this has not materialized so far, important steps have been taken that have given confidence to investors, and the dynamics and the level reached by the issuance of green bonds demonstrate both the necessity and the viability of the new instrument.

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