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The EU Green Bond Market

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Abstract

Climate change is the current awareness in our daily life and is considered as a catastrophe that we will face in a near future if no urgent action is taken in place. This reality is expanding the need for more responsible investment and innovation to improve sustainable performance and projects aligned with the Paris Agreement and the UN Agenda 2030, directing Countries able to reach a net zero transition withing the next 30 years. Therefore, green finance has been considered very important nowadays to stimulate low carbon transition. This is where green bond contributes.

The European Union participation in the green bond market has been considerable increasing. Furthermore, the EU is also refereed as the global voice spreading the importance that all Countries shall work together so that we can save our Planet. And the numbers are quite impressive for the current year, despite the still economic shock caused by the energy crises due to Russia x Ukraine war.

In summary, the European Union is trying its best to be aligned with the Paris Agreement and the United Nations Agenda for 2030. With the European Union's new green deal, it is expected Europe to implement more measures to better improve policies toward environmentally friendly goals. It is expected that the EU will maintain leadership among ESG issuers in the long term. Green bonds are and will be seen for a long time as key instruments to guarantee Europe's energy independence in the upcoming years and to mitigate the climate change problem.

Table of Contents

Introduction

So far, we have witnessed large content news highlighting a series of weather catastrophe events worldwide. This makes us alert to the idea that we are approaching climate change catastrophe, which is not a surprise, as several Global Scientists and climate change think experts have been alerting us for so many decades.

The current situation is that the Earth is expected to remain 1 degree hotter than a century ago, above the pre-industrial level temperature, and worsening; it is forecast to rise to 1.5 degrees Celsius into the next decade. Therefore, climate stabilization will be the specific, deliberate global intervention in nature and the economy. Busch, Ferrarini, and Grunewald (2021) enforce this reality by showing in their paper that the degree of correlation between climate change and the financial system is significantly correlated. Furthermore, Global warming can affect the way how the global economy operates.

This reality is expanding the need for more responsible investment and innovation to improve sustainable performance. Therefore, sustainable finance has been considered important to stimulate low carbon transition. Furthermore, climate change is becoming part integrity of the global financial decision. Environment finance can incorporate ESG factors and interact daily in a significant connection between investors and lenders, as it is feasible to provide products and services with a focus on substantial environmental performance on the global market.

The European Commission has been proactively engaging in a sustainable race towards carbon net zero, and it is now carrying this urgency and the global voice spreading the importance that all Countries shall work together so that we can save our Planet. According to Busch, Ferrarini, and Grunewald; (2021), the EU is so committed to sustainable finance, highlighting the importance of the financial sector as fundamental to the green transition role as it is capable of connecting supply and demand for green investments.

Several authors mentioned how important is the green bond market. For instance, according to Krushelnytska (2017), the private sector is more prone each day to seek new opportunities to invest capital in sources of market-rate financial returns and environmental benefits. As a result, the Green Bonds Market, which was created in 2007 by the European Investment Bank, has been growing very fast, having grown by 50% per year from 2015-2020, according to a European

Parliament report (2022) and becoming more widespread if compared to other financial market instruments.

In the first chapter of this thesis, I will highlight the challenges that we are facing today with climate change and the danger caused by climate change to households and to the financial system in general within Europe. In fact, climate change can negatively impact the Global Economy.

In addition, I will discuss how urgent it is to mitigate the climate change problem and how necessary it is to construct more engagement among all Country representative leaders to curb the sudden temperature that is currently affecting many parts of the Earth, and that is expected to be worsening in few years. Furthermore, I will show that the economic sector that has been most contributing to GHG emissions is energy due to its high dependency on fossil fuels.

I will bring an overview of the major international climate change summits that have evolved in past years and how committed Country leaders have become in current days. Globe leaderships are indeed becoming more concerned about sustainable future and ESG factors.

Among these several international summit conferences, I highlight the most important, the Paris Agreement and the COP26. These two conferences could gather higher participants in numbers, and most importantly, they were more committed to settling a climate change goal and plan. The COP26 in Glasgow that happened in 2021 was, in fact, a watershed for the financial sector as every decision taken in the finance industry and institutions will now be taken into consideration for a net zero goal approach. At the end of the first chapter, I will explain the ESG three factors concept and particularities; However, the thesis is, entirely based, on the Environmental aspect and focuses on green bonds.

In the second chapter, I will bring the concept of green finance, starting from its origin and development throughout history and outcomes. Also, I highlight how essential green finance is to the European Union and how the EU is applying measures and policies toward an eco-friendlier feature to be recognized as a zero-target economy by 2050.

Still, in the second chapter, I will analyze how important it is to raise investment cash flows for sustainable projects. This is because fast decarbonization requires a massive investment in renewable sources. For this reason, green bonds are key financial instruments. However, in order

to reach this goal, more investments in the sustainable project need to be implemented and stimulated. It is needed an average of 350 billion euros annually until 2030 within Europe.

In the third chapter, I will bring a clear concept of green bonds, their history, and their importance. Furthermore, I will discuss that despite green bonds are considered a new instrument in the financial market, it is progressively increasing the connection between capital markets and green investments, and it is growing in popularity nowadays. This is because green bonds allow several parties to borrow capital resources from investors to finance green projects, business activities, and assets. In addition, green bonds make a positive signal to issuers in the markets as the corporation is viewed as sustainable awareness.

Them, I will discuss the importance of the financial sector as a critical instrument to foment the finance green projects and a fast way to reach low carbon transition and a more sustainable economy. In fact, in the near future, it is expected that corporates will increase the demand for green credentials to get more access to capital.

Later, I will describe the main particularities that make and certify a green bond to be distinguished as greener. For this, I explain the taxonomy concept and importance, labels, and the main second- and third-party associations that have essential duties such as conducting a scrutiny screening in the green bonds, issuing certifications, and checking if any greenwashing occurrence or green bonds is misleading.

In the fourth chapter, which is the main topic of this thesis, I will give an overview of green bonds in Europe. I will focus my analysis on how the EU green bond market has increased in the past few years, especially from 2014 to 2022. Despite the pandemic economic shock in 2020, the issuance of green bonds in Europe kept rising. This event increased the number of responsible impact investors. Speculator investors also tend to buy green bonds to hedge their portfolio against possible losses, as green bonds tend to be considered less risky.

In addition, I will describe the importance of the European Central Bank supporting this green bond market. ECB recognizes climate change as a source of physical and transitional risks.

Furthermore, I will highlight how committed the European Union is to Taxonomy, having the European Union implemented its own taxonomy particularities and Rules. The EU has been developing many tools to fight greenwashing throughout the EU Taxonomy so that investors and

the financial market, which are the leading players capturing capital flows to finance sustainable projects, can feel more confident in operating in this market.

Nevertheless, the European Union is proving its leadership in this market, despite the disturbances in the economy suffered in the past few years, such as bringing how far in volumes the European Union is advancing in this market. The European green bond's main goal is to support issuers' low-carbon transition.

Despite the economic disturbances that all Countries have faced, such as the covid-pandemic and post covid recovery, the European Union is still engaged in the green bond segment. Even though green bond issuance in Europe was reduced during the COVID-19 pandemic, due to market stress and volatility, it restarted in the second half of 2020, especially the EU Sovereign green bonds, which gained momentum after the Post Covid Era.

I also consider as crucial to include in this thesis the current energy crisis caused by the Russia x Ukraine war and how it can directly impact the European Union green market. The Ukraine war proved to us how reliant Russia's European Union is due to the energy sector. After the economic sanctions were applied to Russia, the energy prices started sky rocking, making Europe vulnerable. However, I base my analysis that this war can be the real watershed for Europe in terms of seeking to become energy independent in a short time. And this will probably perfect be financed by EU green bonds. In this view, it is expected an increase in the green bond market within Europe.

In sum, Europe has been proving it is highly committed to sustainable financial projects aligned to the Paris Agreement goals and the United Nations Agenda for 2030.

Chapter I – Sustainability

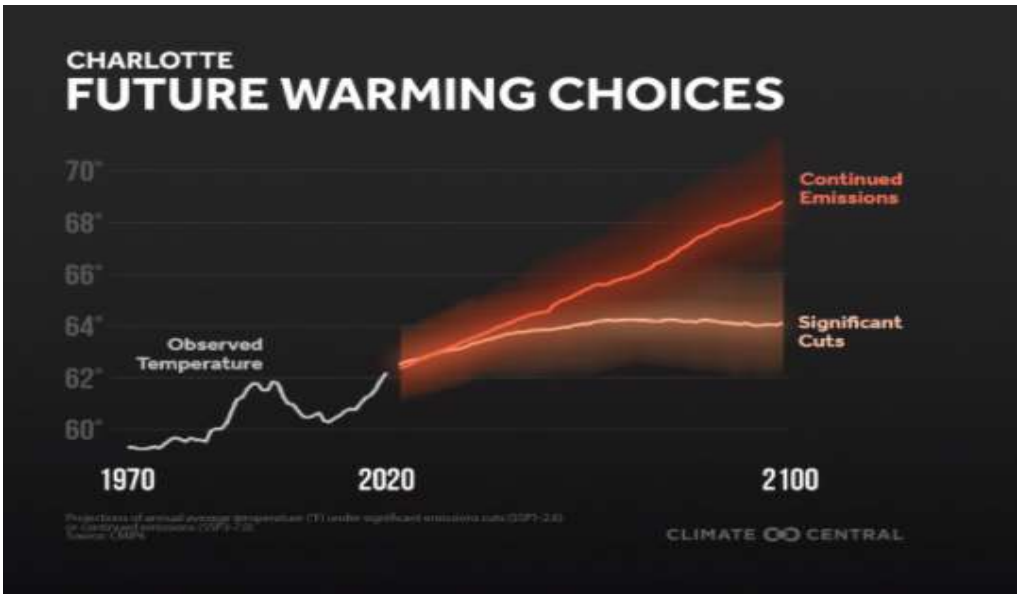
1.1 - Global Warming

Global warming can affect the way the global economy operates. As the temperature rises, economic sectors such as agriculture will be disrupted as the soil will become too arid or wet for a continuous crop which will have a huge impact on global food production. Moreover, with the Planet becoming quick hotter, sea levels will increase alongside more events of hurricanes and heavy rain, resulting in city inundations and devastations. These fatal fates for our Planet will also bring the disruption of natural resources and species as well as humanitarian crises, forcing people to migrate to other countries that can probably end in a political conflict.

There is a global need to mitigate this extreme drastic fate. That is, an urgency to curb the sudden temperature rise. A strong commitment must be made among all countries' leaders to salve the current and future generations. The agreement is to focus on new sources of technologies that will provide us with more efficient renewable energy and daily life less dependent on fossil fuel.

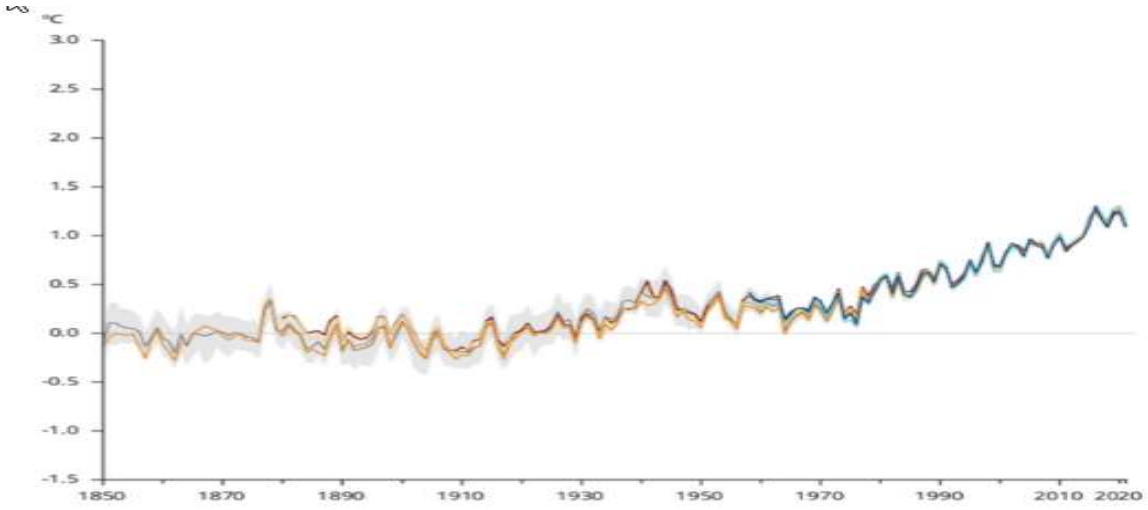
For Tiwari, Abakah, Gabauer, and Dwumfour; (2021), Fossil fuels have been for decades the primary source of energy and the main contributor to greenhouse gas (GHG) emissions. GHG impacts highly on global warming and climate change. According to these authors, we should be less reliant on fossil fuel energy and develop more renewable energy technologies. As an example, we could rely more on wind, biomass, wave, and solar power, which fit better in a more sustainable economy.

In the graph below, there is an estimative taken by climate central regarding the temperature forecast up to 2100 years. In addition, it makes a comparison in case the entire globe decides to curb CO2 emissions, where we can see a significant reduction and constant temperature level.



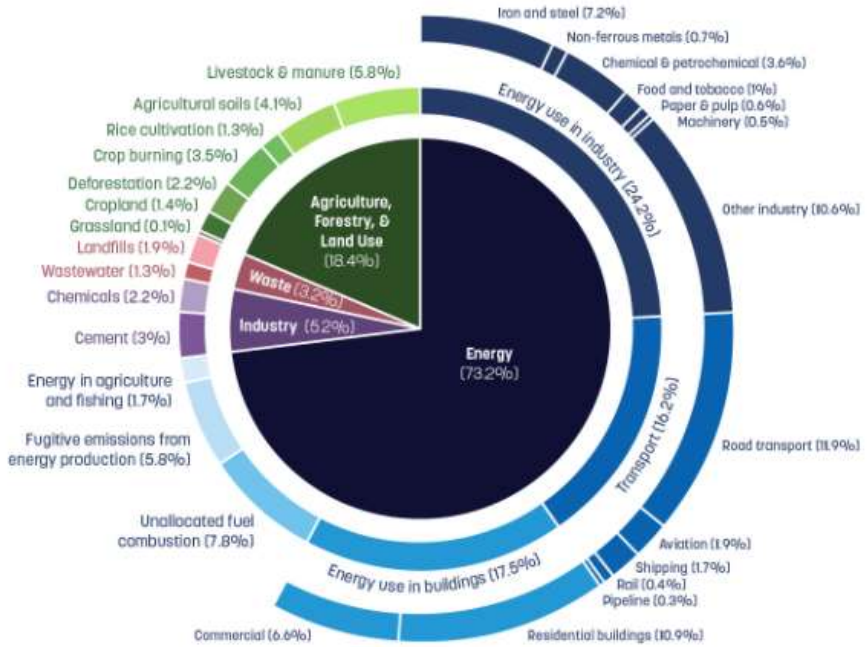
Source Figure: Temperature rise projection – Global COP26, local impact – Source: Global COP26, Local Impacts | Climate Central 3 Nov 2021.

The figure below, from European Environmental Agency, shows the real Global temperature rise tendency in case we do not take action.



Source: European Environmental Agency website.

In the figure below taken by the World Bank, we can see that most of the greenhouse gas emissions levels emitted in the atmosphere come from the energy sector, having the energy sector the one that most contributed.



Global Greenhouse Gas Emissions by Sector, 2016

Source: Adapted from Hannah Ritchie, Our World in Data, 2020: https://ourworldindata.org/emissions-by-sector.
Data sources: Climate Watch, World Resources Institute, 2020.

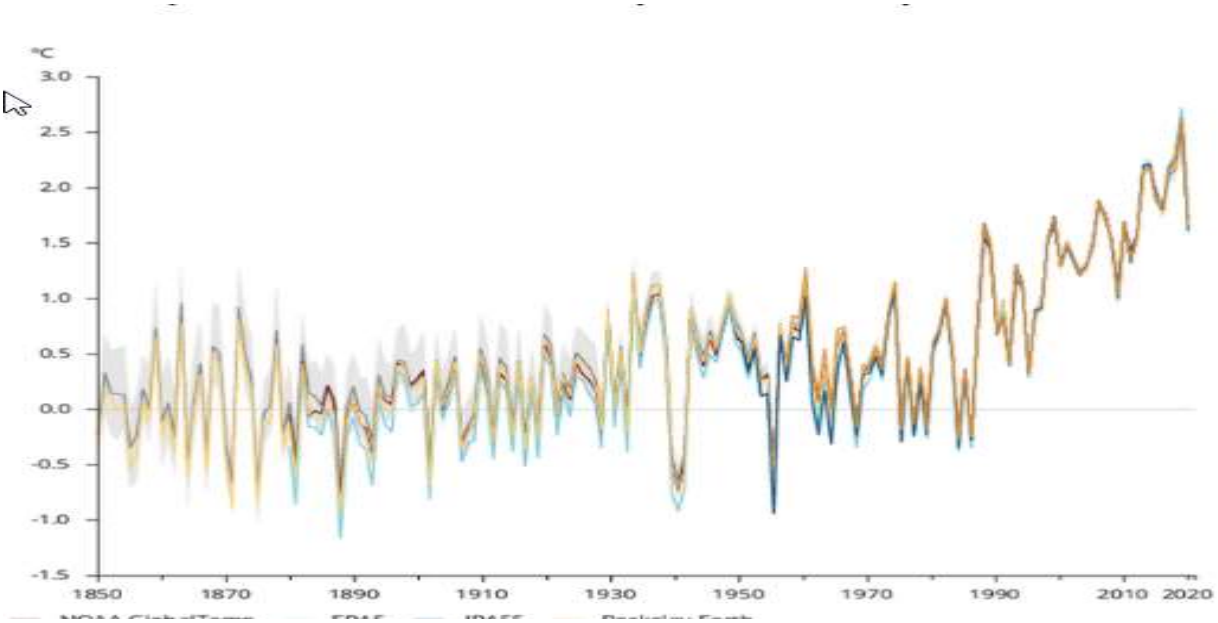
Source: Figure 2: Greenhouse gas emission by sector worldwide. Source: Climate Change: 2021 in 5 Numbers (worldbank.org) 16 December 2021

As already proved by many scientists and recognized by many global leaders, there's no planet B, and we are running against time to have a minimum chance to save the Earth. Accordingly, to World Economic Forum occurred in 2019, the main risks to our Planet as real threats are weapons of mass destruction, failure of climate-change mitigation and adaptation, extreme weather events such as floods and storms, water crises, and finally, major natural disasters.

Indeed, climate change will negatively impact all economies as well as financial systems.

1.2 - Climate Change in Europe

The figure below from the European Environmental Agency shows the average temperature rise in Europe from 1850 until 2020.



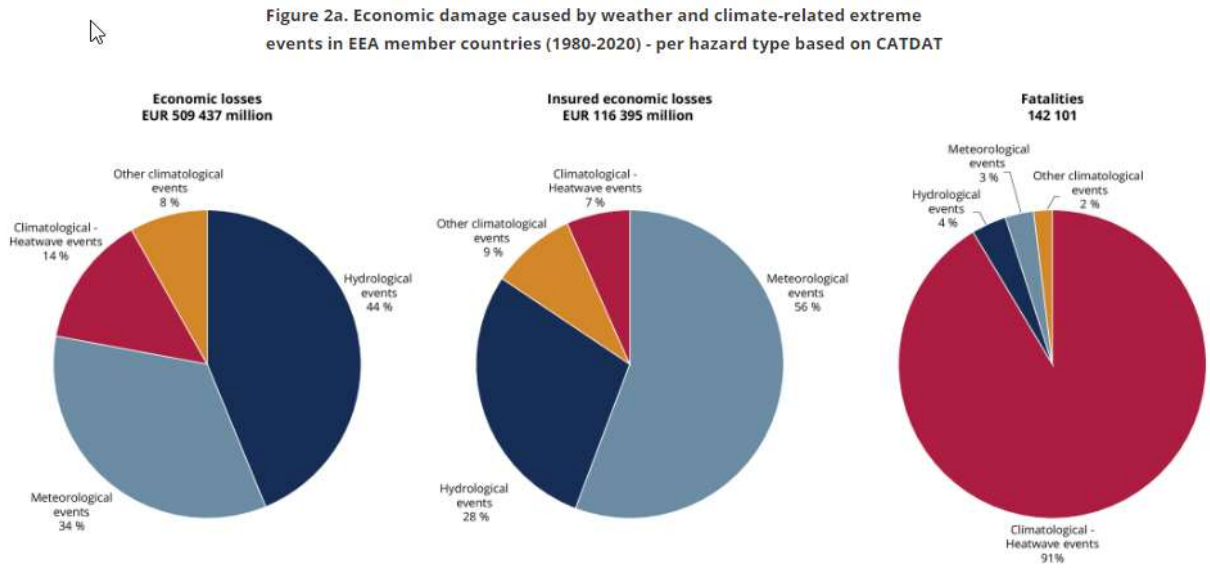
Source: European Environmental agency website.

We can see that from the 2015-2021 period, the temperature has suddenly increased, reaching a peak in terms of temperature rise record, having Europe become hotter than the other continents.

According to (The European Environmental Agency website), the CMIP6 projections that the temperatures in Europe will keep increasing this Century even more if compared in terms of the global average. CMIP6 European temperature climate scenario is that areas such as north-eastern, northern Scandinavia, and some parts of Mediterranean countries will have the temperatures the most increase.

The European Environmental Agency (2022) reinforce this fact by stating that it is expected a rising temperature in Europe from 1.2 to 3.4 degree Celsius and from 4.1 to 8.5 degree Celsius as projected by the SSP1-2.6 and by the SSP5-8.5 scenario respectively when compared to period years from 2071-2100 to 1981-2100.

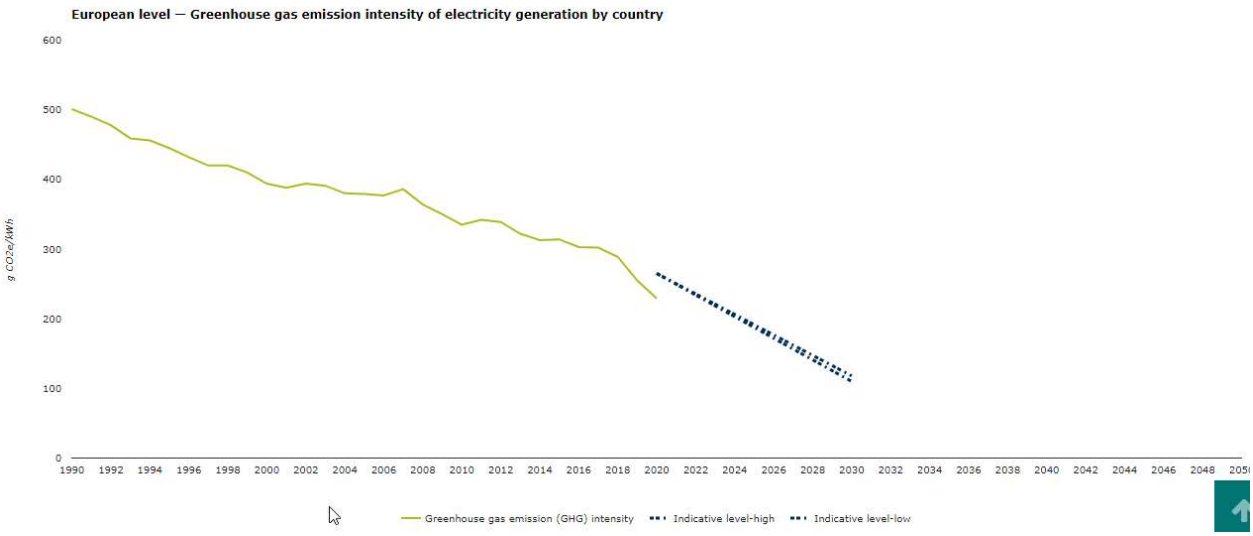
The loss in terms of GDP for the European countries is immense due to the temperature rise. The figure below (European Environment Agency; (Feb 2022) comprises all the EU member states and the total loss in GDP terms yearly due to climate change.



Source: European Environmental Agency website.

In other to revert the climate consequences and the reduction in economic and social aspects, the European Countries are embracing the United Nations' commitments and plans to curb the global temperature below 2 degrees Celsius by 2050 and limit it to 1.5 degrees Celsius. (EBC 2020) Following the Paris Agreement on climate change and the United Nations 2030 Agenda for more development in terms of sustainability, Europe intends to arrive in 2050 with the status of a climate-neutral continent.

As shown by European Environmental Agency, European Countries are making efforts to reduce by 55% the greenhouse gases emitted in the atmosphere by 2030 compared to 1990 in other to diminish the impact of heatwaves and natural disasters on their economy.



Source: European Environmental Agency website 2022.

Accordingly, to the World Bank, the more energy efficiency that Global economies can create and sustainable solutions within different economic sectors will contribute to a low carbon transition success.

1.3 – European Central Bank participation in climate change risk mitigation

As per ECB website; (2022) in 2020 the ECB engaged in the climate change battle by issuing a non-binding guideline to European banks guidance on Climate and Environmental Risks for Banks as ECB has identified that there's a huge risk coming from climate change disclosures. However, the ECB recognizes the importance of the finance sector to finance sustainable growth, and this is the reason why ECB wants more regulation and attention from the European banks in following its advice.

The (ECB 2020) Guideline highlights the importance that the financial sector must be aware of climate-related and environmental risks in terms of short, medium, and long-term in the sector / organizational structure that they are operating. In addition, financial institutions must report their exposure, publish information and key metrics on climate-related and environmental risks through

aggregated risk data, and must be capable of quantifying, identifying, monitoring, and mitigating these risks in their portfolios throughout stress tests to avoid net cash outflows or exhaustion of liquidity.

Furthermore, ECB; (2022) took an excellent measure on assuming fundamental climate change in the European monetary policy structure to make price stability feasible. This assumption increases the correlation of the impact of climate change to financial risk and highlights the importance of industries, companies, and institutions entities to diminish their carbon emission and to be more aligned to the Paris Agreement agenda and to the EU's ambitious carbon neutral by 2050. The ECB intends to make a deep screener on corporate bond holdings and collateral framework.

Regarding Corporate bond holding, ECB expects them to be evaluated on climate performance correlated to low greenhouse gas emissions in the atmosphere and a plan of carbon reduction. As per the collateral framework, entities with a high carbon emission profile will have their assets issuance capability limited.

From 2026, only companies and credit claims that are aligned to the Corporate Sustainability Reporting Directive CSRD will have their assets and credit claims considered in accordance with the Euro system. In addition, ECB will demand from 2024 that rating agencies bring more transparency in how their correlate climate change risks in their criteria analysis.

1.4 – Global Climate Change Conferences

Several meetings in order to check greenhouse gas levels have been taken so far. Even though climate change has been overspreading on the recent world agenda, this concern has been under debate since 1994, led by the United Nations. Since 1994 the UNFCCC has been leading the way to mitigate GHGs levels updates and make it transparent to the entire global community the dangers that it is coming ahead of us. World leaders have concluded that climate change, in fact, represents an irreversible threat to the Planet and human beings, and the entire Earth species. In the paragraph below, I describe briefly the meaning and duties of each of these International Summits / Conventions.

UNFCCC – The United Nations Framework Convention on climate change is, in fact, an international treaty introduced during the year 1992.

During the year 1992, the CO2 had risen considerably, forcing several world leaders to believe we were entering in a real probability of a catastrophic future. Participants had engaged in a commitment among themselves to guarantee greenhouse-gas stabilization in the atmosphere. However, only two years later, they came across together to try to put into practice this goal. There was a total of 50 ratifications among 197 Parties. This Earth Summit convention was held in Rio de Janeiro, Brazil, and it was the first international considered agreement regarding climate change topic.

1995 – First COP (Conference of Parties) took place in Berlin, Germany – It was agreed that industrialized economies should immerse into GHG reduction performances. However, the United States, which is considered one of the most polluters in terms of industrialized countries rank, was in this period not engaged with this environmental policy, having created several circumstances, excuses, and conditions to not follow the agreement.

1997 – First Kyoto Protocol – It was important to introduce an international emission trading, complemented by the EU, known as the EU emissions trading system. It is important to mention that the international policy conducted by the United States was not engaged with climate change considerations, having also decided to exit the Protocol in 2001. Until this period, these Earth summit conferences were not taken as an important internal and external policy by many polluter States. Few Countries have committed and ratified the Protocol so far, and the extreme point taken into consideration was that the States part of the Protocol were the ones that had last contributed to daily life in the greenhouse gas emissions.

2005 – Kyoto Protocol – This agreement was more focused on CHG reduction and emissions by the 2012 period. It is important to highlight that this was the period when more developed countries started to get more concerned regarding this policy.

2014 – The European Union Commission launched the "2030 climate and energy framework". This is a great optimistic step to provide EU economies feasibility of a more effective energy policy in terms of sustainability, competitiveness, and security. The 2030 agenda englobe goals of greenhouse gas emissions reduction and the increasing use of new ways of renewable energies,

and the use of a known circular economy. The main objective is to curb risks coming from climate change to be followed between the 2020-2030 decade.

COP 21 - 2015 – Paris – France – The Paris Agreement – The world leaders, 196 Parties, had a specific goal of preventing a catastrophic climate change by committing themselves to secure that the Earth's temperature would be held below 2 degrees Celsius above pre-industrial levels as well as limiting the global temperature to 1.5 C above pre-industrial levels. In addition, as reported in the book The Rise of Green Finance in Europe.

This agreement's main objective was to make all countries able to deal when suddenly impacted by climate change effects and, at the same time, permit finance flows to be driven by low greenhouse gas emissions and climate-resilient pathways. At this summit was created an international treaty on climate change called the Paris Agreement. COP 21 and Paris Agreement gave rise to green finance.

In 2016 the treaty was signed by 195 Countries. In 2015 it was created the SDG (Sustainable development goals). This was very remarkable as the EU signed the United Nations Paris agreement. The NDCs, (nationally determined contributions); are the actions that all involved must take to target the climate change menace.

The figure below (from the United Nations website) illustrates the 17 SDGs, which is an agenda for the 2030 Year.

Source: Figure: Sustainable development goals; Sustainable Development Goals – Green Financing as a Bridge to the SDGs (sustainalytics.com)

The remarkable fact is that in the Paris Agreement, there was no distinction between developed or non-develop States; that is, participation was welcomed and opened to all Countries in general. However, there was no standard greenhouse gas target emission that could indicate each of the participants. In fact, it was limited in accordance with its technological and participants' economic growth capacity.

2017 – COP 23 UN Climate Change conference in Germany. During this period, the EU created an expert group called HLEG, a group specialized in preparing a transparent reform.

2021 – COP 26 – Occurred in Glasgow, UK. Leaders concluded that a transition would require collective action from the entire globe since the economic and social costs can be immensely impaired if the transition is delayed. COP 26, in fact, has called for maximum efforts regarding cutting emissions, adaptation, and climate finance. The goal is that all the participants make their efforts to achieve a net zero carbon emission by 2050.

According to the UN Climate Change Conference, (2021) the likelihood estimation from the policies that are nowadays implemented is that it is forecasted by Scientists and climate experts that Earth will be reached an average temperature of 2.6C to 2.7C by 2100, including an

uncertainty ranging from 2C to 3.6C. The temperature is expected to drop from (1.4C to 2.6C) by the same analyzed year if countries join to meet the long-term net-zero objectives.

In addition, as per UN Climate Change Conference; (2021) COP 26 was categorized by some specialists as a watershed for finance or as a financial system for net zero as every decision taken in the finance sector and institutions will need to consider the climate change event. In addition, it introduced the "phasedown" idea against fossil-fuel subsidies coal, as well as a concern of warming loss adaptation which is the creation of a fund to finance loss and damage resulting from global warming.

To emphasize, Mark Carney; (2021) comments about the Glasgow financial alliance for net zero (GFANZ), which was an important step to make it possible to increase the amount of investment needed for sustainability project investments. In GFANZ, during 2021, over 250 financial institutions gathered together, joining an average of total assets of USD 80 Trillion linked to the Glasgow COP26 race to net zero targets committed to decarbonizing the economy.

1.5 - IPCC Report

In 1988, the United Nations took a further step in creating the IPCC. IPCC reports cover all the United Nations overviews related to Global warming, and it is nowadays the main international treaty on climate change. Its main objective is to provide a scientific view of climate change correlating to the economic impact.

The Intergovernmental Panel on Climate Change IPCC; (2022), show that there is an emergency need to reduce global carbon dioxide (CO2) emissions by 2030 with a global commitment to achieve a net zero within 2050 to guarantee a limit of 1.5 degrees temperature.

According to OCDE; (2016) report, it is essential to know that to guarantee a limit of 1.5 degrees Celsius goal, global emissions need to reach zero rate by 2075.

Chomsky and Pollin; (2020) bring in their paper a piece of information extracted by IPCC specialists that for us to reach the 1.5 degrees maximum temperature in global terms by 2100, we

must work to reduce the global net CO2 emissions from 45 percent to 2030 alongside a commitment to a net zero target by 2050

During IPCC report 2022, 5 points were into attention[1]:

1 – It is possible to act now. However, time is closing rapidly because the opportunity for far-reaching climate change is limited to this decade. (IPCC Report; (2022))

2 – Every 0,1 matters: That is, for every carbon emission in the atmosphere, we will suffer severe irreversible consequences from the warming temperature. (IPCC Report; (2022))

3 – Climate change is already occurring: ancient glaciers are melting, floods and extreme heat are happening in many parts of the Earth, and humans will face severe consequences if actions are not put into practice. (IPCC Report; (2022))

4 – Adaptation: It is essential to construct adaptation projects, especially for the people living in higher climate change vulnerability cities, from a long-term perspective. (IPCC Report; (2022))

5 – An excellent pathway is to build sustainable cities to avoid eventual impacts that can surge from climate change and conserve/protect ecosystems. (IPCC Report; (2022))

1.6 - ESG

ESG (Environmental, Social, and Governance) was created in 2004 in the investment field, and it has been growing in importance around the entire globe, and it is currently in use by many corporations and financial entities. Composed of three pillars throughout ESG factors, it is now more feasible to measure companies' reputation, compliance, costs, and correlate to eventual risks.

[1] 5 key take-aways from the NEW IPCC Report (ethos.se) 04 March 2022

Source: Anevis

Source ESG Ratings: How can a business' environmental and social impact be measured? (earlymetrics.com)

It is highly important that financial institutions incorporate ESG factors in their management risk scheme, especially the "E,"; which is related specifically to the "Environment" sector, to reduce regulators' and investors' risks and losses due to environmental risk exposures and climate change. Bush, Ferrarini and Gruneweld; (2021) bring an estimation by European Commission experts that around half of entire bank assets in European countries are now exposed to a certain extent to climate change-related risk.

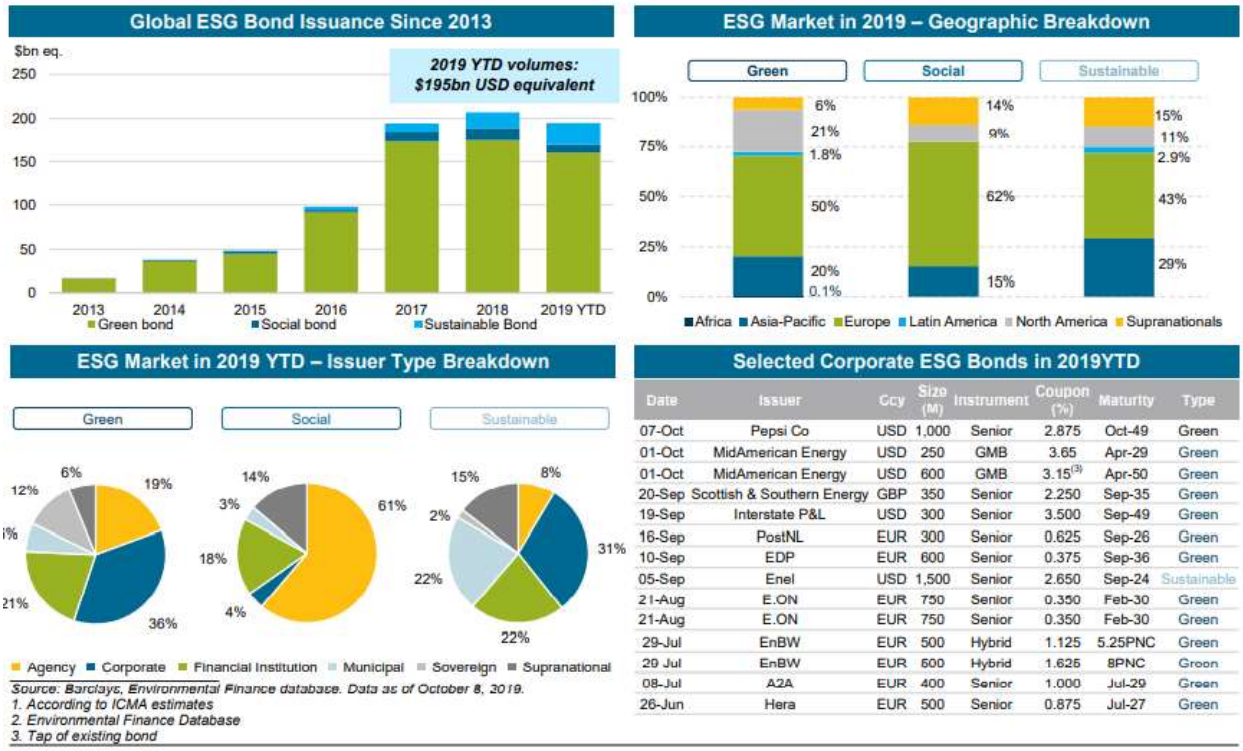
Torre and Chiappini; (2020) expose in their book Contemporary issues on sustainable finance that there is an urgent need for companies to be aware of climate change risk, which is very correlated to their assets and bonds. And the authors explain how important it is for investors company's transparency regarding climate risk disclosure. This makes more confident investors, insurance companies, and lenders as they are comfortable in screening if there's a high degree of climate change risk or if there's a good opportunity for their investments.

Nevertheless, in the European Union, financial market transparency has been enforced, making large companies more aware of the importance of publishing reports showing their intention and policies under implementation that must be related to ESG aspects; such as environmental and social responsibility, how they are treating their employees, how diverse are their company boards including gender, age, diversity, etc.; and how respectable they consider human rights, how are these companies in terms of bribery and corruption involvement.

The types of investors that combine social and financial returns through the practice of specific investment strategy, such as impact-based ESG investing methodology, that represents the impact investors. Impact investors foresee the projection of long-term returns due to investment in companies that benefit the environment.

As per Sherwood and Pollard (2019), impact-based ESG investors are entirely concerned about corporates and company policies if they are really focused on activities related to environmental protection or non-aggression. That is, investors tend to get more involved in information if companies are involved in carbon emission, water pollution, stranded fossil fuels assets, and so on.

ESG investors combine P/E ratios, the company's performance in comparison to its industry competitors, with a company's ESG analysis to better invest its capital. In the figure below, we can have an overview of Global ESG issuance.



Source: Barclays, 2021

Chapter II - Green Finance

Green Finance turns feasible for capital flow direct to sustainable development projects and initiatives, and it can generate a positive externality on environmental growth for all participants. For instance, it can finance projects to develop technologies that emit less or zero greenhouse gas emissions (GHGs), a more industrial control with less impact on pollution, waste, and biodiversity protection. These sustainable projects can reduce the impact of climate change on the population and products. Green Bonds first appeared in the Green Finance field. We have been using Green bonds to finance a more sustainable economy by all Corporations, Countries, responsible investors, and Financial entities, aware that a better effort is needed to save the Earth.

2.1 - Background

Climate change is impacting Human beings and planet species,' and it is the main threat for this 21st Century. The impact of climate change due to Global Warming is becoming more drastic. Freebund; (2020) exposes the idea that it is insufficient to coordinate alone the potential economic and financial impacts that may surge from climate change. Freebund's position is in accordance if compared to what has been reported daily on the news.

Accordingly, to (IPCC; 2022), Intergovernmental Panel on Climate Change, innumerous recent global nature with severe natural events such as loss of biodiversity, extreme weather conditions which consequently impact negatively, such as ice melting causing oceans levels to rise; droughts causing harvests and crops adversely and many others destruction.

Furthermore, as stated in the report extracted in MSCI; (2022), climate change can cause severe damage to the financial system's stability. There are two risks coming from climate change; they are known transition risk and physical risk. According to MSCI (2022), transition risks are the impact suffered on carbon-intensive assets surged from possible shocks during the net zero transition phase. Whereas physical risk is the damage to the environment, lands, buildings, etc, caused by climate change forces and events.

Busch, Ferrarini, and Grunewald; (2021) give examples of physical risks; for instance: storms, floods and heatwaves, ocean acidification, and rising sea levels, while transition risks are related to financial impacts coming from sudden new climate policy, technologies, and relative modifications inside market preferences and social norms during the transition to a low-carbon economy.

The authors Mac, Roca, Stewart and Sahin (2020) state that Sustainable and responsible investment is not new, and it has been gaining more regulation by governments which in turn made possible this market growth for institutional investors; for instance: insurance funds, pensions, and sovereign wealth. For instance, the authors bring the information that during 1986, environmental sustainability gained force after Chernobyl nuclear power disaster and the Exxon Valdez Oil spill.

Most Governments, especially the European Union States, have committed themselves to building a plan to mitigate a more sustainable world. So far, the EU has joined its forces by participating in a series of international sustainable conferences. Some of these climate awareness conferences were considered remarkable; for instance: the 1992 COP RIO, the 2015 Paris Summit conference that originated the most discussed protocol (the Paris Agreement), especially in the economic and financial environment, and the COP 26 in Glasgow in 2021 where world leaders emphasized the vital necessity for a race against the near future catastrophe derived from climate change.

Furthermore, we are witnessing more participation among governments in recent years in elaborating a more sustainable policy to reach the 2030 United Nations Agenda for Sustainable Development.

Freenburn (2020) highlights that the Paris Agreement's ambition to diminish the climate change impact needs a large number of investments. Lower carbon and climate-resilient infrastructure need trillions of investment dollars. Freenburn (2020) also highlights that for climate adaptation, demands a more $ 280-500 billion USD per year in addition to what we have already investing in infrastructure until 2050. The author in addition says that one way to reach these additional amounts of money can come through green bonds. He reports that green bonds are capable to capitalize these capital funds and channel them into environmentally projects, making reality a more sustainable infrastructure and stimulating the net zero-emission economy.

Moreover, according to Tolliver (2020), even though developed countries have committed themselves during the Paris Agreement to build a plan to direct USD 100 billion per year for the period comprehended from 2020 to 2025, the International Agency complemented the idea that around 53 USD Billion per year must be channelized to energy incentives investments until 2035 so that it will be possible to limit the temperature around 2 degree Celsius. In addition, the participation and commitment of non-developed countries are extremely important to arrive at the goal settled by the Paris Agenda.

Bang and Hovl (2016) complement that after a series of climate change conferences and summits, The Paris agreement was a summit that mainly brought countries' attention to a more integration towards fewer carbon emissions to a start agreement. Although Countries are not legally binding on submitting their carbon reduction targets to nationally determined contributions (NDCs), each country must provide a public report to other participants regarding its progress. Although it is not compulsory to curb climate change, countries must show their commitment to meeting their reduction targets. Previously, Kyoto's conference gave room to free riding. For instance: important countries responsible for high CO2 emissions failed to ratify it, such as the USA and Canada, and the ones that ratified did not present a feasible plan to meet measures to tackle the curb emission problem.

Additionally, Bang and Hovl (2016) enforce the idea that the Paris Agreement's main objective is to create commitments among participants and climate change impact awareness and that we must be able to make all the efforts in order to get a global temperatures reduction from 2 to 1.5 degrees C within 2050-2100 Years.

Keely, Managi, and Tolliver (2020) state that the Paris agreement under the United Nations Framework Convention on Climate Change (UNFCCC) is the first central global policy-driven signatories toward more prone to finance a low-carbon development. The Nationally determined contributions (NDCs), which are at the core of the agreement, request a greenhouse gas (GHG) emission reduction and the use of a sustainable economy to adapt better to climate change.

According to (European Commission) website, in 2015, we reached a step mark concluding on an international level the adoption of the UN2030 Agenda and sustainable development goals and the Paris climate agreement. In addition, the European Commission highlights that the Paris climate agreement counts on a good financial flow directed especially to projects related to low-carbon for

a more climate change reduction. Furthermore, in December 2019, the European Commission publicly presented the European Green Deal, which is designed with the intention to make Europe a recognized example of the first climate-neutral countries by 2050.

The main goal of the Paris Agreement, which COP 26 Conference reinforced, was to create measures to tackle the problem of global warming rising below 2 degrees Celsius by 2050 by encouraging Countries to redirect their economies through a process of low carbon transition. For this intake, the developed countries, such as the European Union, were responsible for supporting the remaining economies in this transition through financial assistance.

Bang and Hovl (2016) emphasize how integrated are EU to comply with the Paris Agreement premises. It is due to the EU enforcement mechanism measures. The EU enforcement mechanism measures to encourage members to pursue targets; if not, facing the risk of being withdrawn from the agreement.

The IPCC issue a yearly report with climate change data alerting that a significant change in the system is necessary to reach a future reversal condition. That means environmental awareness shall increase. This primary purpose gave origin to green finance, in other words, sustainable finance. Even though IPCC warnings since 1990, global emissions have not stopped increasing in the past decades and have reached a high level in history.

2.2 - Green Economics

Loiseau, Saikky, Antikainen, Hansjurgens, Pitkanen, Leskinen, Kuikman and Thomsen (2016) view the green economy as a concept associated with well-being and social equity and is influential in reducing environmental risks and ecological scarcities, as it is linked to qualitative growth, generating efficiency when using natural resources. The development of cleaner technologies able to cause less pollution and waste and use materials and resources more efficiently was considered green products.

In addition, as per Loiseau, Saikky, Antikainen, Hansjurgens, Pitkanen, Leskinen, Kuikman and Thomsen (2016), green economy is important as it is used as a roadway to sustainability by the

World Bank and the United Nations as a tool to address the financial and climate change crises. Therefore, it is proving to be an excellent instrument for reaching climate mitigation targets shown by the Paris Agreement.

Migliorelli and Dessertine (2019) demonstrate that despite the urgency in reducing the global temperature, the Paris Agreement was also remarkable as it highlighted the importance of countries increasing their strengths in dealing with climate change impacts through adaptation. In addition, the Paris Agreement requires that countries must be climate-resilient and capitalize on their finance flows correlated with lower GHG emissions.

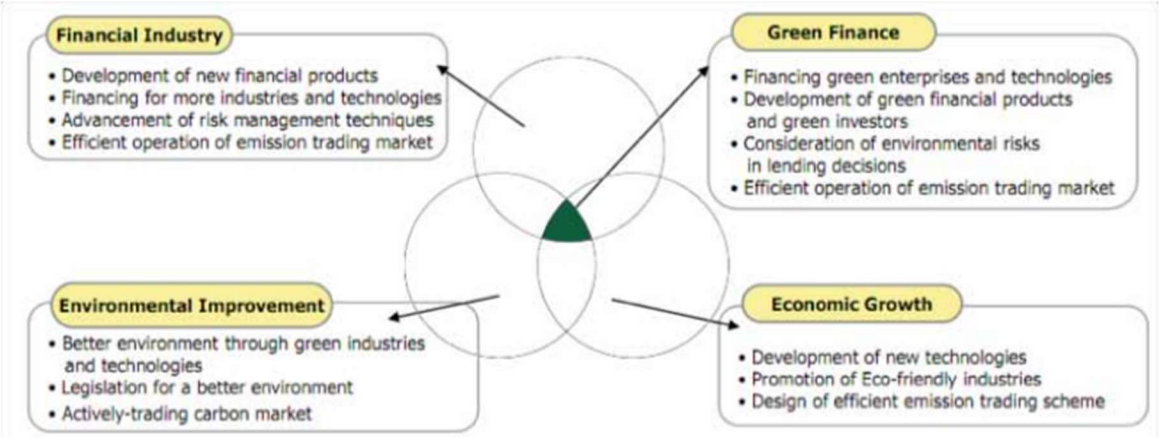
2.3 - Green Finance definition and importance

For Migliorelli and Dessertine (2020), Sustainable finance or green finance means a mechanism of creating sustainable value over time in the financial model, products, and market. Green Finance, which emerged in the last decade, refers to financial stocks direct to SDG achievement, in other words, the most promising method to reach environmental goals. In the figure below, we can see what the main green finance goals are.

Source: Figure: SDG, Sustainable finance, and its components (source: book Sustainability and financial risks page 9).

Sustainable finance englobes the ESG (Environmental, social, and governance) principles which is getting more and more in the daily life of borrowers and investors as well as on business decisions and investment strategies, and it can reveal companies' risk profile indicating performance and losses that banks and insurers can absorb. According to IMF (2019), ESG factors as part of main equities analysis has been growing in importance in recent years. Through ESG factors, portfolio managers are more capable of verifying possible risks and rewards.

Figure below shows a more detailed structure aspect of green finance activities.



Source: Jin Noh Hee, *Financial Strategy to Accelerate Innovation for Green Growth* (2010).

Source: Figure: The green finance interface; FS_Green Finance 01 02 (unescap.org)

Ziolo and Sergi (2019) bring in their paper on the main feature of green finance. That is: green finance prioritizes environmental preservation, and it is composed of three aspects such as; reduce, recycle and reuse throughout the use of new technologies and green financial products. Furthermore, the authors correlate the banking sector as the key, the main pillar of green finance, because it can make a perfect interaction between the environment and financial industry, reaching a result in economic growth.

As per the UN agenda for 2030, it is inside green finance that derived Green, social and sustainable bonds which are financial instruments that can help achieve the sustainable development goal SDGs.

As previously described, the European Union intends to reach a net CO2 zero target by 2050. However, to turn this into reality, it is vital to raise Global economic investments in sustainable projects. For instance, fast decarbonization demands massive investment in renewable sources. Moreover, this is where green finance helps, making possible long-term investment duration. In other words, green finance is specifically the basis of ESG, where the central concept is to implement sustainable economic activities in the long term.

Torre and Chiappini; (2020) relate that taking into consideration ESG factors, especially the environmental one in the European financial system and on the financial decision-making, is highly positive not only to guarantee a more sustainable European economy with protected natural resources but also; to reaching more stability in the region in terms of finance and economy. In addition, both authors are prone to the idea that sustainability demands a long-term committed perspective in generating funds for critical infrastructure as we are trying to respond to climate change as a long-term threat.

Sustainable investment foments the environmental objective. It stimulates efficiency due to better use of renewable energy, raw materials, the implementation of water projects, clean air, and other environmentally conscious business. Also, it focuses on better use of water and soil and avoids the impacts on biodiversity through the incentives of reduction of greenhouse gas emissions, circular economy, and so on.

Torre and Chiappini (2020) also say that companies that are more toward environmental goals or are basing their business plan on a more climate change mitigation investors will see those companies with more confidence in terms of applying the funds entirely into sustainable activities, so these companies' assets will be viewed as 100% correlated to sustainability. By contrast, for companies that are still attached to non-sustainable activities, only assets directed to finance eco-friendly activities will be considered sustainable.

However, several changes must be made over the global economic production, starting with replacing brow energy sources such as fossil fuels with clean, renewable energy such as solar and wind, solar, hydropower, biomass, and geothermal. Also, adapting fast, the automobile industry to electric vehicles, incentivizing forestation, better matters of growing crops, heating houses, storing energy, and so on.

The financial market presence is becoming huge, supporting more modernization in the economies and incentivizing more capital flow to sustainable projects from renewable energy and fuel derivatives instruments.

In other words, reinforced by the European Commission website, sustainable/green finance is recognized as a method that englobes the conception of climate, green, social finance, and all sustainability-related themes that are relevant to avoid divergences in the financial system. Through finance, it is possible to reach ambitious goals for economic prosperity and growth. Furthermore, low carbon investing is a method to create an investment portfolio capable of reducing exposure to securities that tend to become stranded. Furthermore, (European Commission) put in evidence that with sustainable finance, the European Union will be able to deliver all the goals set by the European Green Deal.

As per (European Commission), the European Union is a leader in fomenting this financial system that supports sustainable growth as this sector is the key provider of resources, the sector able to mobilize and allocate an efficiently large number of private capitals, the main instrument to reach the Paris Agreement and (SDGs) UN Sustainable Development Goals.

Migliorelli and Dessertine; (2019) View sustainable finance goals as a measure to increment the number of financial flows. That is, it permits an augmentation of capital flow incurred from banking, insurance, and investment from the public and private sectors to SDGs' main priorities.

In summary, green or sustainable investments are channeled to climate change mitigation and adaptation and stimulate global economies to follow in projects with positive externalities to humans and all other species. For example, these projects are seeing a more circular economy, biodiversity and Natural resources prevention, pollution control and prevention, new technologies that guarantee more renewable energy, and so on.

2.4 – History of Green Finance

According to Loiseau, Saikky, Antikainen, Hansjurgens, Pitkanen, Leskinen, Kuikman and Thomsen; (2016) the green finance/economy concept, firstly introduced by Pearce in 1989, has

been present for years in academic world history. It firstly appeared in the market was related to the undervaluation of environmental and social costs over the price system. "*Green economy has been defined by UNEP in 2011 as one that results in improved well-being by social equity, while significantly reducing environmental risks and ecological scarcities."* (Loiseau, Saikky, Antikainen, Hansjurgens, Pitkanen, Leskinen, Kuikman and Thomsen; (2016)). Therefore, the notion became more extensive towards low-carbon technology stimulation and production, more efficient and socially beneficial inclusive.

Due to increased environmental debate, governments and organizations have accepted to embrace the transition to a lower carbon economy, using the finance sector, which is considered vital and feasible to reach sustainable transition and climate neutrality. Furthermore, the financial sector is the main linkage between investors, governments, and corporations. In other to achieve a more sustainable world, all global continents must embark on this mindset and develop feasible conditions together. For instance, the development of fund projects to build a more environmentally friendly set plan and more sustainable finance.

Nowadays, we are surrounded by news related to extreme weather events, and these events are negatively impacting financial sectors as well as a household daily basis. Many authors and climate experts keep on alerting that climate change will soon be transformed into a huge global catastrophe. In addition, that will impact everybody lives as well as the entire financial system. To complement this information, Busch, Ferrarini, and Grunewald; (2021) emphasize that entities like banks and financial institutions are extremely exposed to financial risks in case of rising temperatures.

Migliorelli and Dessertine; (2019) additionally emphasize that the increasing incidence of storms, droughts, and floods, which are climate-related extreme weather events, are increasing awareness in the global community. However, green finance is very useful in making a reality the adaptation to the global economy that we face on a daily basis.

2.5 - EU and the Green Finance – EU New Green Deal.

The EU recognizes Green Finance's importance as it is vital for the Green Bond Markets. In 2018 The EU Commission created an action plan for financing sustainable growth. Later, it gave birth to the European Green Deal, and following 2020, the European green deal investment plan was created. Furthermore, the authors Loiseau, Saikky, Antikainen, Hansjurgens, Pitkanen, Leskinen, Kuikman and Thomsen; (2016) report that in the European Union, several measures correlated to green finance tasks are yet incorporated into strategic documents, for instance, the Europe 2020 and the resource efficiency roadmap.

All these frameworks were created with a mobilization intention plan with a considerable amount of public and private investments in sustainable projects within the continent until 2030, having the main goal of promoting a more climate-neutral transition and inclusive economy.

As per the 2030 climate target plan (European Commission), the EU will need to invest approximately 350 billion euros annually until 2030. However, this amount of investment is a real challenge for the capacity of the public sector alone. Moreover, many authors affirm and recognize the financial sector as a key role in this primary goal. It is focused on achieving zero greenhouse gases emission by 2050 Year making it possible to boost economic growth. The Green Deal is related to the sustainability development goals on the United Nation's 2030 Agenda. In 2021 the European Commission published strategies for financing the transition to a sustainable economy.

In the figure below, we can see the principles behind the European Green Deal.

Source: Figure: The European Green Deal; Source: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52019DC0640&from=ET European Commission – December 2019

As previously mentioned, the financial market plays a prominent role in this scenario as it is the sector that can create these funds as it connects industries, companies, and investors, capturing investments and redirecting those to sustainable projects, which in turn foments our primary goal, which is the reduction of greenhouse gas emissions. The fund for environmentally friendly projects comes from bonds, more known in the market as green bonds. Green bonds firstly appeared in the market in 2007, issued by EIB European Investment Bank. The European Unios has been taking a great role in this field.

According to CBI ;(2019) report, after COP21 in Paris, many financial centers decided to take responsibility for green or sustainable finance initiatives concerning the market and economic needs. GB markets have been growing exponentially since 2012 globally and in European terms.

As per OCDE COP 26[2] reports OECD; (2021); recognized that to succeed in the global transition, more effective coordination among private stakeholders and public authorities shall be undergone.

[2] OCDE – COP 26 – page 1

The target plan of implementation of the EU New Deal is connecting to sustainable finance goals in a global sphere.

The European Green Deal brings several package tools under Paris Agreement. For example, it includes the EU taxonomy as well as new forms of strategies to reach sustainable finance. When referring to sustainability, the EU is a Global leader. The Green Deal is linked to the EU as a further way of growth.

As explicit in the book Sustainable Finance in Europe, the authors Bush, Ferrarini, and Grunewald; (2021) highlight that the European Green Deal is extremely positive for the EU as it is focused on United Nation's 2030 Agenda and the United Nations Sustainable Development Goals, and the commitment to reach its economic growth by 2050. The main reason is that the EU Green Deal goal is to provide the EU with modern, prosperous society, resource-efficient, guaranteeing a net-zero emission by 2050 and, consequently: a very competitive economy

A great incentive has been put into practice in the EU to stimulate renewable energy generation and distribution, achieving, as a result, a reduction of greenhouse gas emissions. One of the measures was to provide low-rate loans to renewable energy industry manufacturers.

The main effort is to improve efficiency among industries and firms to find a viable mechanism to arrive at new technologies changing their production chains and strategies. For example, circular economy, efficient decarbonization is associated with more efficient energy, such as hydrogen. However, for this to occur, these industries must get an access flow of capital and credits.

At the same time, the EU recognizes that the transition to a low-carbon economy shall be conducted in a careful way so that it does not end in misleading equity prices, portfolios, and economic disruption.

Chapter III – Green Bonds

3.1 – Green Bonds Market Definition

According to Migliorelli and Dessertine; (2019) in their book The Rise of Green Finance in Europe, 2007 was a remarkable year as it was due to Green bonds creation. It was also the beginning of the connexion between capital markets and green investments pursuing an environmental goal. Still considered as a new financial instrument in the financial market, it is a bond exclusively destinated to provide capital flows to finance current, new, or future green projects.

They are considered key financial instruments enforcing the "E" on ESG issues and a linkage to pursue the Paris Agreement objectives and the European Green Deal commitments. Maltais and Nykvist; (2020) describe Green Bonds as a good opportunity for institutional investors: insurance companies, sovereign wealth funds, pension funds, mutual funds, and so on.

The definition from CBI taken by its website is an international organization, and the main purpose is to mobilize capital to tackle climate ambitions. Furthermore, CBI experts state that green bonds are vital for a rapid transition goal of low-carbon emission, guaranteeing, consequently, a more stable economy. CBI's mission is to focus on helping drive down the cost of capital for large-scale climate and infrastructure projects and to support governments seeking increased capital markets investment to meet climate and greenhouse gas (GHG) emission reduction goals.

To complement this position, the authors Tang and Zhang, (2020) describe green bonds as financial innovation and important financial instrument development to improve and facilitate sustainable investing with environmental benefit impacts and social welfare. Freburn (2020) is also motivated by the green bond debt security, and it emphasizes how developed it is compared to the conservative bond market and how powerful it is in terms of raising capital to support climate or environmental-related projects, such as renewable energy and clean transport.

Maltais and Nykvist; (2020) complement this idea by saying that these financial assets are like conventional fixed income securities issued by capital-raising entities with a "use of proceeds

clause" to raise capital specifically to finance expected environmentally friendly projects, which is different from Vanilla bonds generally for working capital purposes.

Fatica, Panzica, and Rancan; (2021) describe green bonds as very promisor as it is powerful in channeling funds to environmental projects, and at the same time, as it is incorporated by ESG factor, it contributes to increasing the awareness among the investors regarding environmental risks. Still focusing on the importance of green bonds, Maltais and Nykvist (2020) report that these green assets can improve energy efficiency, can reduce pollution, and make better use of water and nature conservation, avoiding waste management. All of this also contribute to a better climate adaptation.

In clear words, their main creation is to make it feasible for the World to make a transition from carbon emission to a greener economy through sustainable alternatives supporting climate and environmental projects such as renewable energy, sustainable water management, climate change adaptation, pollution prevention, and control, biodiversity, and natural resource conservation and many other projects with a positive externality to the environment. Capital flows are channeled to these investments, helping countries and all involved to achieve their path to a lower carbon economy and to foment environmental sustainability.

Busch, Ferrari and Grunewald; (2021) explain that Green Bonds permit different entities to borrow capital resources from investors to finance green projects, business activities & assets. Migliorelli and Dessertine; (2019) emphasize the importance of green bonds, assuming the high importance of these financial instruments in fomenting the development of the green finance market. Furthermore, it is increasing each day in popularity not only by investors but also by issuers. For example, we are seeing an increasing tendency of GB growth issuance by large corporations, municipalities and national governments, banks, and also by international financial organizations.

Another important positive profile of green bonds, well described by (Mac, Roca, Steward, and Sahin; (2021), is that Green Bonds are less correlated to other fixed income securities, which is suitable for better diversification of investors. As per (Deschryver and Mariz; (2020), Green Bonds are less volatile than Conventional Bonds. According to Pauline and Frederic (2020), The main reason is that GB is more focused on long-term institutional investors with a profile more toward arbitrage strategy, and it is composed of investor base diversification.

As Per Maltais and Nykvist; (2020), GB is a tool for greening the financial sector in a race for greener economies. The author complements this idea by describing that Banks' sentiment is not convenient to charge an extra fee to GB issuers not to make greenium less competitive than conventional bonds.

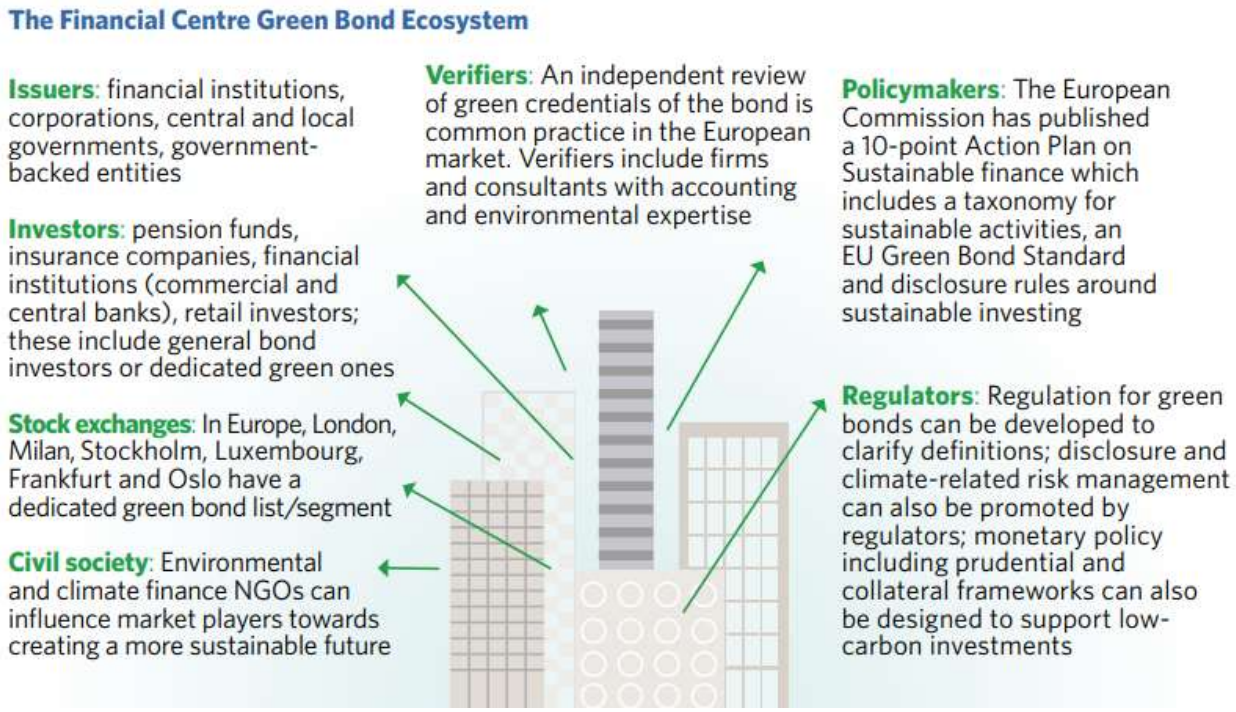
In the figure below, taken from ICMA 2018, we can see the main characteristics of green bonds.

Table 1. Four categories of green bonds (ICMA, 2018).

Category	Definition
Green Use of Proceeds Bonds	Similar to traditional bonds by offering full recourse to the issuer and sharing the same credit rating as the issuer.
Green Use of Proceeds Revenue Bonds	Non-recourse to the issuer and repays investors based on a revenue stream such as tolls, fees, and taxes.
Green Project Bonds	Recourse or non-recourse to the issuer.
Green Securitized Bonds	Bond collateralized by one or more specific Green Project(s). The first source of repayment is generally the cash flows of the assets.

Figure: Source – Pauline, Frederic 2020

Below, we can see how the green bond system work and who are the main drivers in this market.



Source: Climate bond initiative report (2018)

Furthermore, green bond markets are reliable as they have been gaining enforcement by third-party analysis in transmitting to the public that it is a genuine commitment to environmental investment. Most of these bonds need certification from CBI – Climate Bond Initiative. Tang and Zhang; (2020) state that CBI is a non-profitable international organization, and its function is to promote capital solutions via green bonds for environmental-related projects.

There are currently six models for Green Bond types OCDE; (2016). They are known as corporate bonds, project bonds, asset-backed security (ABS), Supranational – sub-sovereign and agency (SSA) bonds, Municipal bonds, and financial sector bonds. In the points below, we can see a short description of each of these green bond types.

Corporate Green bond: It is a GB issued by enterprises and is very secure to the investor if the corporate entity defaults. Investors gain interest payments and a principal return by maturity. The corporate need to follow the GB use of proceeds.

Green project bond: It is a green bond issued toward financing single or multiple projects, and investors face direct risk exposure accordingly to project risk.

An asset-backed security (ABS): It is a type of bond collateral by one or more specific projects.

Supranational, sub-sovereign, and agency (SSA) green bonds: These are green bonds issued by financial institutions, for instance, the World Bank and EIB, sub-sovereign national development banks, and import-export banks.

Municipal Green bonds: These are the GB issued by a city, region, or municipal government.

Financial sector green bond: It is a corporate bond issued by a financial institution to raise capital to provide loans to green activities, for instance: Agricultural banks.

3.2 – Why are Green Bonds useful instrument

According to the EUROPEAN COMMISSION (2021) the EU GB can be used as a tool supporting issuers in their transition to a more sustainable economic profile as it is aligned to EU Taxonomy. In addition, EU GB is useful for funding long-term projects and transitioning to a more taxonomy alignment perspective.

Tolliver (2020) affirms it is vital to understand the fundamental factors linked to green bond issuance promotion. Because GB is essential for the sustainable development agenda.

As supported by Freeburn (2020), the Green bond's main benefits can be correlated to more funds benefit for sustainability issues as it can reach vast types of investors, permitting GB issuers to enhance their environmental credentials. Even though investors are not prone to investing in a company specifically, they will acquire the bonds seeking sustainable investments. This is one of the reasons GB usually faces an over-subscription rate and spread constriction.

Also, Green Bonds's broader policy benefits are summarized by the European Commission's Technical Expert Group on Sustainable Finance:

"(1) Convert bond market to green, fostering investment in green projects;" (European Commission (2021))

"(2) Enable corporate and institutional transition by creating visibility and scrutiny of issuers' sustainable projects and leading to changes within issuers that promote environmental sustainability;" (European Commission (2021))

"(3) Make green and climate investible: the green bond standards that have been developed together with the ecosystem of external reviewers have allowed markets to invest in green projects with more confidence;" (European Commission (2021))

"(4) Have progressed the policy debate on green finance by providing an example of a large market-driven successful initiative that addresses sustainable development challenges with the effect of stimulating debate on how the initiative may be supported and what lessons can be learned for other initiatives; and;" (European Commission; (2021))

"(5) Expand the green loan market." (European Commission (2021))

As per Krushelnytska (2017), impact investors, those interested in positive environmental and social investments, are important to make a positive contribution to the flow of capital towards bankable projects, reducing, therefore, possible risks and raising returns.

As previously explained, there is pressure these days for European Union Green Bond issuers to develop their transition plans towards a net zero by 2050. More specifically, the EUGB issuers shall be aligned to current market conditions to green bonds and not funding brown assets such as the ones that keep financing, for instance, fossil fuel and nuclear power industries.

As Ehlers and Packer (2017) appoint in their article, Green bonds are helpful as it contributes to an increased cash flow of funds towards environmental projects. Furthermore, it reduces capital costs for issuers, and it is powerful in protecting against climate-change-related risks.

Complementing this idea, Maltais and Nykvist (2020) highlight three main useful GB definitions. Firstly, its broader investor base is powerful in lowering the cost of capital, and it is an asset that attends to investors' current demand, which is sustainable investments.

Tolliver (2020) article shows that Green Bonds offer issuing firms expansion opportunities within green investment capacity as it captures funds for environmentally friendly projects because they can join institutional and socially responsive investors.

For authors Deschryver and Mariz (2020), Green Bonds benefit policymakers, issuers, and investors. Issuers are benefited due to long-term project maturities and lower debt financial expenses. In addition, accordingly, to the authors, green bonds provide financial performance development as well as raise the company's environmental profile. Finally, it is suitable for investors for a less risky portfolio as GB is a less volatile instrument.

Flammer (2020) goes more directly to the point, saying that Green bonds are the perfect intersection between investors' and corporations' interests, but the real main goal for each one is quite different, as investors acquiring Green Bonds tend to seek societal benefits. In contrast, companies issue Green Bonds to acquire capital at a low cost as green bonds can cause a positive response on the market. In a few words, GB makes possible financing from a cheap feasible source.

Fatica, Panzica, and Rancan (2021) describe that green bonds raised from supranational institutions and non-financial corporate benefit with a premium if compared to conventional bonds. This is the reason why companies scored higher in terms of environmental performance and usually take advantage of low capital costs.

Going further in this analysis, Nanayakkara and Colombage (2019) explain that even though Green Bonds are still under lower cash flow compared to conventional bonds, because investors are seeking to engage in a more responsible investment with a sustainable profile, they are more prone to pay a higher premium to acquire GB than CB. This impact directly on the yield curves of these bonds, which in turn generate a positive externality to bonds providers in the sense as green bonds tend to have a lower spread turning the cost of capital for the GB originators low. This guarantees GB issuers a more likelihood of investment opportunities as GB secures issuers' access to capital which is considered a financial benefit. In other words, as explained by Maltais and Nykvist (2020), in the near future, it is expected that corporates will increase demand for green credentials in order to get more access to capital.

In addition, GB market providers can increase their offer of more green-labeled bonds. For Tang and Zhang (2020), green bonds work in favor of investors as they are assets that satisfy the green activities, and it is evaluated with a high ESG score. In addition, these authors also correlate the greener of GB to a better firm performance after the GB announcement. This is because the firm is perceived as sustainable and as having a great likelihood of valuable investment opportunities in its business plan and projects.

As per Maltais and Nykvist (2020), companies and corporations that issue GB is an excellent method to communicate companies project and profile *"stamp of organization quality"* (Maltais and Nykvist (2020)) externally and loyalty secure in their relationship with customers and investors as the company can prove that sustainability is fit in corporation strategic decisions.

Flammer; (2020) complements this view by saying that GB works as a signaling argument exposing companies to credible profiles as it proves to be committed to environmental footprint. That is, the stock market tends to react positively to eco-friendly firms when certified GB is issued in the market. Consequently, it impacts in raising of institutional ownership as well as an enhancement of stock market trading. That is, as a firm vision matters to the market investor, GB exercises influence on investor attention, fundamental and financing cost channels. This contributes to a greater stock liquidity improvement.

Deschryver and Maris (2020) state how correlated it is the issuance of green bonds by corporations to environmental signals to the market. And they give a clear example of Moody's downgrading the RWE credit rating from A1 to Baa3 in 2009 because RWE had been taking a not strong position on projects of subsidized renewables inside Europe.

Freeburn (2020) describes that GB tends to be less volatile than vanilla bonds as GB are used to buy from long-term institutional investors such as pension and wealth funds, insurance companies, and investment funds that use more strategic in portfolio investment that tends to hold GB until maturity.

In addition, Flammer (2020) cites that GB is strongly correlated to a good comparative environmental footprint for issuing companies, and GB issuers tend to improve their environmental performance year by year by reducing their CO2 emissions and raise of eco-friendly commitment behavior that can be checked through achievements of higher environmental ratings.

Accordingly to Flammer (2020), GB is more part of companies' Corporate Finance each day. For instance, the author describes that in March 2014, a Multinational company called Unilever issued a 250M Pounds GB with the intention to reduce by 50% its wastes, GHG emissions, and water usage in its factories. Likewise, in June 2017, Apple issued a 1 billion USD GB because it wanted to finance renewable energy and guarantee more energy efficiency at its facilities and in its supply chain.

All these new sources of renewable energy not only proportionate more efficiency to the companies but also is a source of impacting investing with positive benefit results in social and environmental spheres.

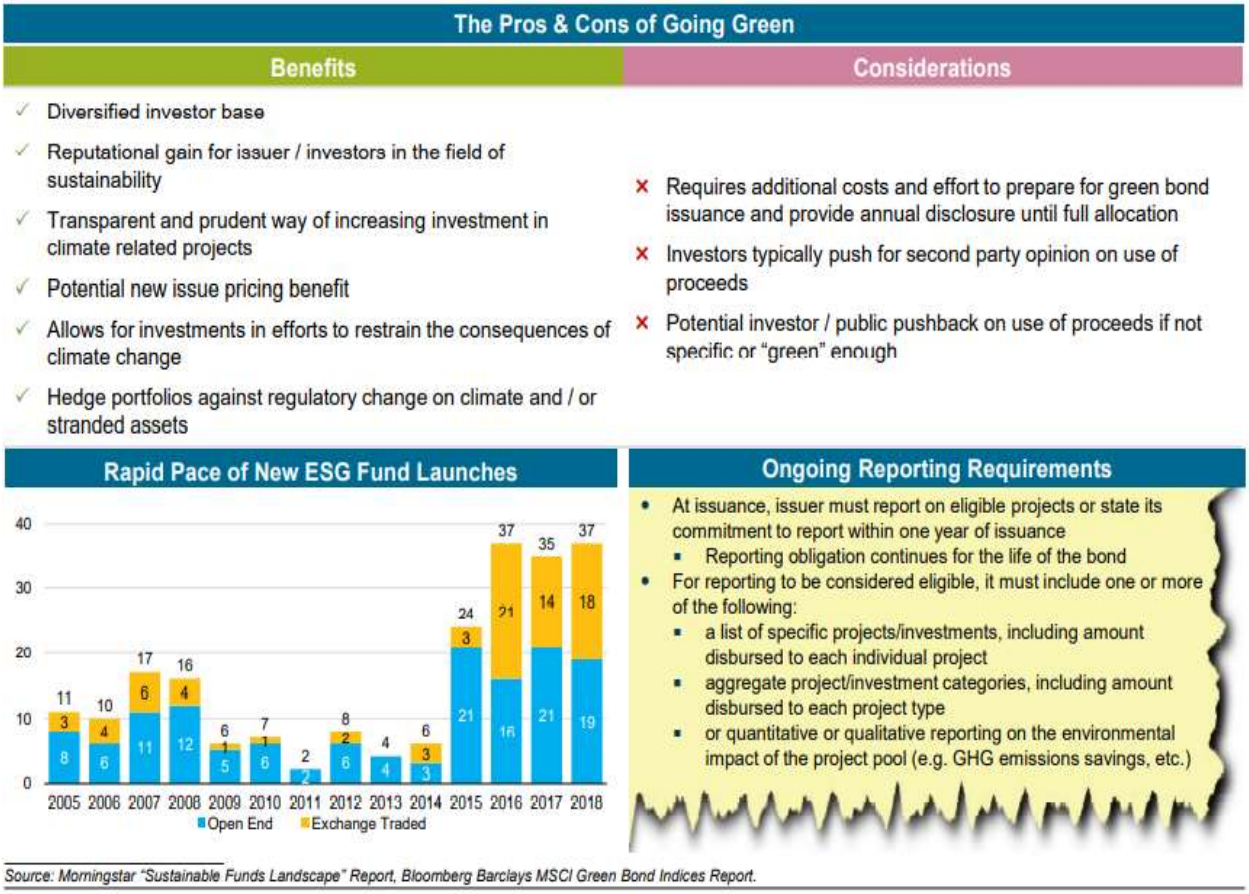
Another advantage of green bonds is that they work as a hedge against environmentally-related financial risks. In the short-term horizon, a GB is issued with a premium, providing a lower-risk investment for investors as these assets are supposed to avoid greenwashing. Green Bonds are mostly, in fact, used to balance portfolios and diversify risks.

For institutional investors, accordingly to the authors Maltais and Nykvist (2020), GB can improve the liquidity of infrastructure assets. Furthermore, the authors report that GB is handy for universal large institutional investors as they are broadly exposed. Therefore, GB is suitable for them as a strategy to shift their risks from financial instruments that generate negative externalities impairing long-term sustainable economy, such as brown assets.

Going deeper, investors, through the acquisition of green bonds, can also reduce risks related to future regulation that can be created related to sustainability which definitely will impact more negatively, generating losses to brown assets. Freeburn (2020) states that, in fact, not all investors that acquire green bond assets are responsible environmental investors. To complement this idea, Flammer (2020) reports that around half percent of the total are categorized in this group. Non-environmental investors are, in fact, speculating when they acquire green bonds as they know these green financial assets will perform positively in the long-term perspective, and it is viewed as a method to better balance their portfolio.

Additionally, Tang and Zhang (2020) emphasize that there is a particular behavior among ESG investors. They are more prone to long-term investment and tend to be more patient when having to deal with loss.

In the figure below Barclays Bank (2022), we can see the pros and cons of using Green bonds.



Source: Barclays; (2022)

3.3 – Transparency of Green Bond – Taxonomy

3.3.1 - What makes a Bond Greener?

Regulators view green bonds as a tool to reach a greener financial sector and economy. Many authors such as Tang and Zhang; (2020) affirm that the idea of green bonds approaches firms' commitments to a more sustainable development which can bring in the long-term more value to these firms, as they are projected to survive in the future compared to the ones remaining with brown assets. Nevertheless, what really makes, in fact, a greener bond?

Freeburn (2020) shows that besides the environmental purposes that are the most distinctive characteristic if compared to vanilla bonds, another important feature that concerns only GB is the external review of issuer and issuance. In other words, a bond to receive a green credential must pass by second-party opinions and third-party analysis. This is to check if their funding projects are related, in fact, to environmental benefit stimulation. The term taxonomy has been used for several decades as scientific information for identification and classification.

However, the green regulation is not unique or global in standard matters. As posed by Freeburn (2020), there is a lack of single regulation for GB global standards, some concepts to establish green credentials were developed. With standards, investors can better understand the use of bonds procedure and can clarify if this financial asset, in fact, fits as a green category.

The two primary international standards are the Green Bond Principles (GBP) created by the International Capital Market Association (ICMA) and the Climate Bonds Standards (CBS) by the Climate Bonds Initiative (CBI). Deschryver and Mariz (2020) describe that according to CBI's database, it is considered only financial assets as green if it brings around 95 % of proceeds that is suitable for green aspects; and in addition, it needs to be aligned to climate bonds taxonomy; and it must portray all the relevant detailed information of the projects to be financed with this green financial asset.

The OCDE (2016) report describes that CBI oversees green definition specification for Climate Bond Standards and Certification scheme handled by a panel of specialists within climate and energy areas. As per CBI (2018) report, the CBI green bond standard guarantee that an asset nominated as greener is truly consisted with the 2 degrees Celsius limit as per settled during Paris Agreement. As an example, the French railway company called SNCF had been highly correlated as per CBI standards, as performing its service under low carbon activities and as a result, SNCF was one of the company in Europe that most received certified climate bonds.

To explain the GBP, Tolliver (2020) says that GB proceeds are exclusively to be applicable to eligible green projects. For instance, these projects are composed of renewable and energy efficiency; pollution control; a more environmentally usage of natural resources and lands; terrestrial and aquatic biodiversity conservation; clean transportation and wastewater management; climate change adaptation more aligned to eco-efficient adapted products; and more green buildings construction which recognized standards.

For the Bonds that follow the green bond principles (GBP), all securities linked to green projects shall be evidenced in the asset document. According to Freeburn's (2020) concept, the green bond principle is good as it implements more interaction within the green bond market. This is because GBP brings guidelines and reports, guaranteeing a more transparency feature in this market. With GBP, investors feel more confident joining the green bond market as GBP provides easy access to information related to green bond issuer environmental impact activities and projects, as well as it helps underwriters provide better standardizing disclosure.

As per Ehlers and Packer (2017) paper, green bond market development gained force after 2014, by the time the green labels started spreading. ICMA International Capital Market Association had a significant contribution to this as it introduced the GBP (Green bonds principles) and CBI (Climate Bond Initiative) in 2014 alongside important investment banks (Bank of America Merrill Lynch, Citi, JPMorgan, BNP Paribas, and HSBC).

According to Freeburn (2020), the CBI is more restricted than GBP as it demands more requirements from green bond issuers; for instance: detailed aspects of the project to be financed with the debt instruments such as disclosing environmental and social aspects. CBI also requires that issuers prove how much of their physical assets are in correlation with the green bonds and prove that the proceeds of the green assets will not suffer impact from issuers' inconsistency regarding environmental activities.

Nevertheless, Green Bonds Principles and Climate Bonds Initiatives are remarkable to green finance as this enhanced the demand for green label bonds issuance. The GBP is the base guideline for green labels in the market, and it is increasingly gaining importance in demand for green labels not only by investors but also by financial institutions. Tang and Zhang (2020) reinforce this view by saying that investors still do not master the environmental impact of green loans and green bonds, which is why international organizations working as third-party reviewers are essential. While GBP is more generical in its analysis, CBI provides a more detailed green taxonomy database by sector.

As per the ICMA (2018) report, The GBP are guidelines for green bond issuers and compounds four components; that is: Use of proceeds, a process for project evaluation and selection, management of proceeds, and reporting. Although the Green bond principle is not mandatory yet, it proposes integrity and transparency development of the green bond market.

Furthermore, the GBP's objectives are turning green bonds into a credible financial instrument and spreading information regarding the importance of green bond investments in the environmental aspects. Moreover, GPB is helpful in giving support to underwriters.

The GPB, according to ICMA (2018) provides a clear disclosure for issuers. This is tangible for investors, banks, underwriters, and all involved in this market to better understand Green Bond's features. According to ICMA (2018), the GBP is helpful due to its transparency and accuracy of information requirements provided to issuers to stakeholders.

Accordingly, to ICMA (2018) reporting, there is a range of green bonds in the market. For instance, Sustainable Bonds are bonds that mix green and social profiles, and Standard Green Use of proceeds bonds are mainly debt obligations following the green bond principles. In addition, there is also the Green Revenue Bond; which is, according to ICMA (2018) *"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 Projects"*. As per ICMA (2018) Moreover, the last one, the green project bond, also aligned to CGP, was created to finance a single of multiple green projects, and the investor has direct exposure to the risk of the projects.

3.3.2 - Labels

Labels can identify responsible investments and make possible the exclusion of brown assets. The first label in Europe was created in 2004 in Austria. Later, France had great participation in this market. In the figure below, we can see the first Labels took place in Europe in a few years.

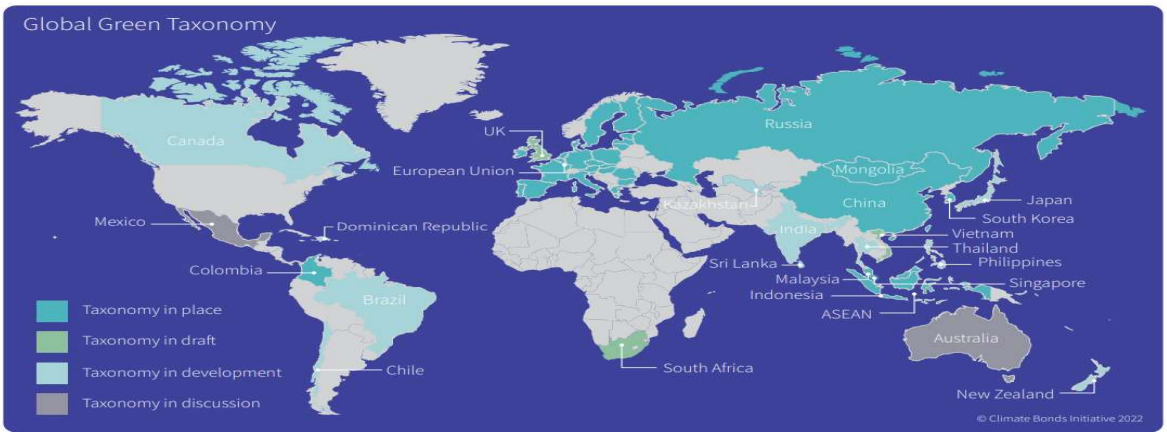
3.3.3 - Taxonomy

As per CBI (2021), sustainable taxonomy is highly increasing market acceptance. Taxonomy is useful as it provides a classification system identifying assets, economic activities, and sectors more prone to environmental action. To explain better, Taxonomy provides guides to all financial market participants, highlighting the assets and activities that are more linked to sustainable investment.

Freeburn (2020) reinforces the taxonomy priority as a method to avoid greenwashing activities. He points out that it is essential that the green bond market be supported by standards and Regulations. This helps this market to be more consistent, and transparent to investors raising confidence in green credentials.

Taxonomy comes through a better harmonization among practitioners of green bonds, investors, and companies; better standards and label solutions translate into a common financial language in this market. Therefore, the taxonomy is feasible for a better identification among many financial instruments in the market because it can clarify among a variety of instruments which ones are following sustainability purposes. Per Ehlers and Packer (2017) paper's, these external certifications and labels permit asset managers to make investors confident as they can prove that their investments are being allocated on real green bonds.

In the figure below, we can see the applied world taxonomy and the degree of taxonomy development. For example, in the European Union, we can see the countries applying the standard developed criteria compared to other continents.



Source: CBI; (2022)

The European Commission, through the development of the European taxonomy, can better allow capital markets to identify and be more proactive in sustainable policy investment opportunities taking into consideration ESG aspects.

In addition, Busch, Ferrarini and Grunewald (2021) states that a green bond market development perspective, it is essential that both investors and asset managers must be capable of identifying the real "green" bonds, the ones with environmental and climate-related benefits. Green taxonomy can identify assets and revenue segments that incorporate environmental objectives identifying which ones are eligible for sustainable investments and inclusion in ESG aspects. Consequently, taxonomy is valuable tool of guidance for all market participants.

Ehlers and Packer (2017), in their article, state that although there is not a common precisely global definition of environmentally beneficial use of proceeds, different standards have gained acceptance among users in the market. Furthermore, these authors also emphasize that many important organizations have started taking more participation within the green bond. These organizations have been joining together to provide green label certifications to assets correlated to different degrees of green definition, including shades of green.

Per Ehlers and Packer (2017), this evidence mainly helps the analysis between investors and asset managers as the label certificates turn to investors the accessibility of the type of the asset they

intend to invest in and make disposal to asset managers a better scenario to satisfy investors' preferences.

According to CBI (2021) firstly, green/sustainable taxonomy was provided by the private sector. Specialist service providers developed the taxonomy ratings, score, and methodology. However, the quality was opaque, and the criteria were not a top-down approach giving space to a greenwashing environment.

Mac, Roca, Stewart, and Sahin (2021) emphasize that with taxonomy, issuers tend to be exposed to the reputational risk of committing greenwashing in case the proceeds of their green bond are not truly related or issuers are not able to prove that the proceeds are related to a positive environmental impact purpose.

The public sector came into a more approach to support the green bond market growth. This resulted in a more regional and national guidance creation aligned with the green bond principles. Nevertheless, it was still voluntary, and the guidelines used to be poor in eligibility criteria which still were a concern for greenwashing activities. This is the reason for the involvement of more public authorities, enhancing the demand for creating a more toolset of eligibility criteria and enforcing more degrees of mandatory.

3.3.4 - Greenwashing

Greenwashing is the real enemy element hidden among various sustainable financial instruments and companies' projects.

Greenwashing is described by some experts as "*corporate disinformation"* (Beldad (2020)) or the *"act of misleading"* (Beldad (2020)), in other words; *"a combination of bad environmental performance with positive claims about their environmental performance"* (Beldad (2020)). Sometimes, this misleading information comes through images suggesting an environmentally friendly image. Greenwashing is related to consumer confusion, green perceived risks, and green trust.

As green bonds are projected to grow each year, greenwashing presence tends to grow as well. Siano, Vollero, Conte, and Amabile (2017) explain in their paper that several stakeholder groups

have been pressuring corporates to perform more sustainable profile pathways. In addition, as the green profile equates to a strong reputation and financial performance, companies are incentivized to present themselves as green even though they are not. There is a non-correlation between talk and action. In addition, some companies are capturing the potential benefits through this green image. However, not taking any real actions towards green projects or "decoupling" / "symbolic management actions"; that is, not making the promised changes in the organization practices to achieve the sustainable profile or even issuing inaccurate or false sustainability statements. Therefore, many organizations are still committing attention deflection when misled by visual imagery linking to self-declared ecolabel certifications.

Greenwashing is growing due to its current complexity inside green bond procedures. Some investors consider difficulty delineating among a variety of sustainable bonds. For instance, an interpretation of which one has better quality has been quite hard for them. However, for the green bond issuers, the adverse condition is that green bonds are still considered a new factor in the market that can occur in possible reputational risks and uncertainty around significant green assets. Lammer (2020) enforces this view stating that some companies want to take advantage of the positive signal GB exercises in the market by issuing this type of security portraying an image of environmentally responsible entities; however, these corporations do not take the necessary sustainable responsibilities in their business decision structure.

Going further using the explanation Laufer (2003), Greenwashing wrongly leads consumers regarding the environmental practice of bond issuers sector or industry, and it is obviously made with the intention of disinformation regarding corporation main objectives and plans. It is hard to verify in the short term among corporation bond issuers who practice greenwashing.

As commented in the European Parliament article, Spinaci (2022), says that the European Commission has been concerned about this theme as it constantly finds a lack of transparency, and low-quality green bond issuance, which can result in a conflict of interest and the potential risk of not channeling enough investments to sustainable projects. For instance, some green bond demand from companies is due to seeking tax relief. This attitude is totally against green bonds' role in the sustainable financial world market. CBI's (2021) article reaffirms this in its 2021 Sustainable debts summary; that in terms of standardization, this market needs to improve more. Nowadays, it is

possible to see misleading disclosure or clarification and a lack of standard regulation in the green market. So, this is a point where the market should continue to evolve.

3.3.5 - Green Bond Market Associations – ICMA, GBP, CBI, CICERO.

Alongside Taxonomy, we have two main dominant markets association straitening the standardization of green bonds. For Spinaci (2022), they are known as Green Bond Principles (GBPs) and International Capital Market Association (ICMA). The third recognized market association is called Climate Bonds Initiative (CBI), which has developed the Climate Bond Standard.

Their main collaboration is work on issues such as disposal of practice guidelines and general view followed by most certification schemes, making available to the whole market participants turning into a global standard guideline for green bonds. These guidelines are not compulsory, so all participants take this basis as a voluntary process, which is not followed by everyone.

The CBI provides a list of databases regarding green bonds green labeled for over one decade and proposes certifications and standards procedures which are eligible for Climate bond certification after or course, the external procedure approval review certifying that the asset meets environmental criteria and that the bond issuer is committed to environmental impact project. CBI (2021) article judge assets' low carbon value by scientific metric sector criteria and implement a rigorous analysis to guarantee that certified bonds and GB providers positively correlate to Paris Agreement below 2 C targets.

It is important to emphasize that the EU Green Bond has followed these guidelines, specifically more aligned to the GBPs. By contrast, the CBI is not preferable among users as it is considered stricter than Green Bond principles on its analysis for guideline frame, relying strongly on taxonomy principles such as screening criteria and approval from external reviewers. Furthermore, the CBI indices methodology is also considered binary. Ehlers and Packer (2017) as it is not flexible regarding the asset's nature or 100% green or non-green financial instruments.

This lack of granular perception in its analyses makes CBI lose some rich information that other indices providers take advantage of, such as more assessment on the forecast of persistent environmental benefits or the degree of environmental benefits.

Freeburn (2020) highlights the difference between CBI and GBP acceptance of green standards through the Repsol case, a Spain oil company. Repsol had issued green bonds to finance energy efficiency in its chemical and refinery facilities. Reviewed by Viego Eiris, it was compliant with GBP after analysis of reporting, tracking, and disclosure commitments showing no evidence of possible greenwashing or rise in greenhouse gas emissions.

However, per Freeburn (2020) CBI refused to accept Repsol's bond as green as the company did not represent any change in its business model. That is; it was perceived that the company was not intended to invest in renewable, green energy or in making a low carbon transition; in fact, Repsol was more prone to turn its fossil fuel refineries more efficiently, making viable a more long-life fossil fuel profile activity. Per Freeburn (2020), as Repsol's targets were far from the Paris Agreement, the company's bond was removed from the green bond indexes.

Apart from ICMA, CBI we have a substantial global initiative since 2016 present in this green bond market, giving more precise information regarding the environment. This group is called FSB TCFD – Financial Stability Board's Task Force on Climate-related Financial Disclosures.

Another external review is called CICERO. Created in 2016 and based in Oslo, it is a climate research institute with the primary objective to provide second opinions, evaluate asset issuers, and assess how attached the bond is to a long-term horizon for low-carbon and environmental benefits. According to OCDE (2016), CICERO is also recognized by many as shades of green methodology as it classifies GB in a dark, medium, or light degree in terms of approach to 2050 climate solution contribution. In the table below, we can notice the distinction among the three shadow segments designed by CICERO.

Rating	Description
Dark Green	"Dark green is allocated to projects and solutions that correspond to the long-term vision of a low carbon and climate resilient future. Fossil-fueled technologies that lock in long-term emissions do not qualify for financing. Ideally, exposure to transitional and physical climate risk is considered or mitigated. Examples include wind energy projects with a strong governance structure that integrates environmental concerns."
Medium Green	"Medium green is allocated to projects and solutions that represent steps towards the long-term vision, but are not quite there yet. Fossil-fueled technologies that lock in long-term emissions do not qualify for financing. Physical and transition climate risks might be considered. Examples include bridging technologies such as plug-in hybrid buses."
Light Green	"Light green is allocated to projects and solutions that are climate friendly but do not by themselves represent or contribute to the long-term vision. These represent necessary and potentially significant short-term GHG emission reductions,but need to be managed to avoid extension of equipment lifetime that can lock-in fossil fuel elements. Projects may be exposed to the physical and transitional climate risk without appropriate strategies in place to protect them. Examples include efficiency investments for shipping technologies when clean alternatives are not available. "

Source: CICERO Shades of Green rating system from green bond frameworks. Adapted from CICERO Shades of Green (2018). FULLTEXT01.pdf (diva-portal.org)

Ehlers and Packer (2017) paper[3] abord that some rating agency companies also have an essential role in assessing the greenness and the expected lifetime environmental impact score of assets in the market. Moody's, a recognizable agency rating, also performs a green bond assessment (GBA) function. Moody's agency makes green bond assessments measuring how aligned the asset is with the GBP and the likelihood that this bond will invest in environmentally friendly projects. Another critical rating agency that contributes to the certification procedures is Standard & Poor's Agency. Standard & Poor's green evaluation, created in 2017, makes a technical, environmental impact assessment on green assets.

[3] BIS Quarterly review 2017 - Torsten Ehlers, Frank Packer 2017 – Page 96

3.3.6 - Green Bond Indices

The Green bond providers also act as a certification institution. Green bond indices can identify among a variety of bonds the ones that must be considered green. Green bond indices have spread after 2014. They are significant in an investment context as Investors use this Index methodology to diversify their risks. We have in the financial market several institutions operating in this field. However, the largest and most recognized ones are Bank of America Merrill Lynch, Barclays MSCI, Standard & Poor's, and Solactive.

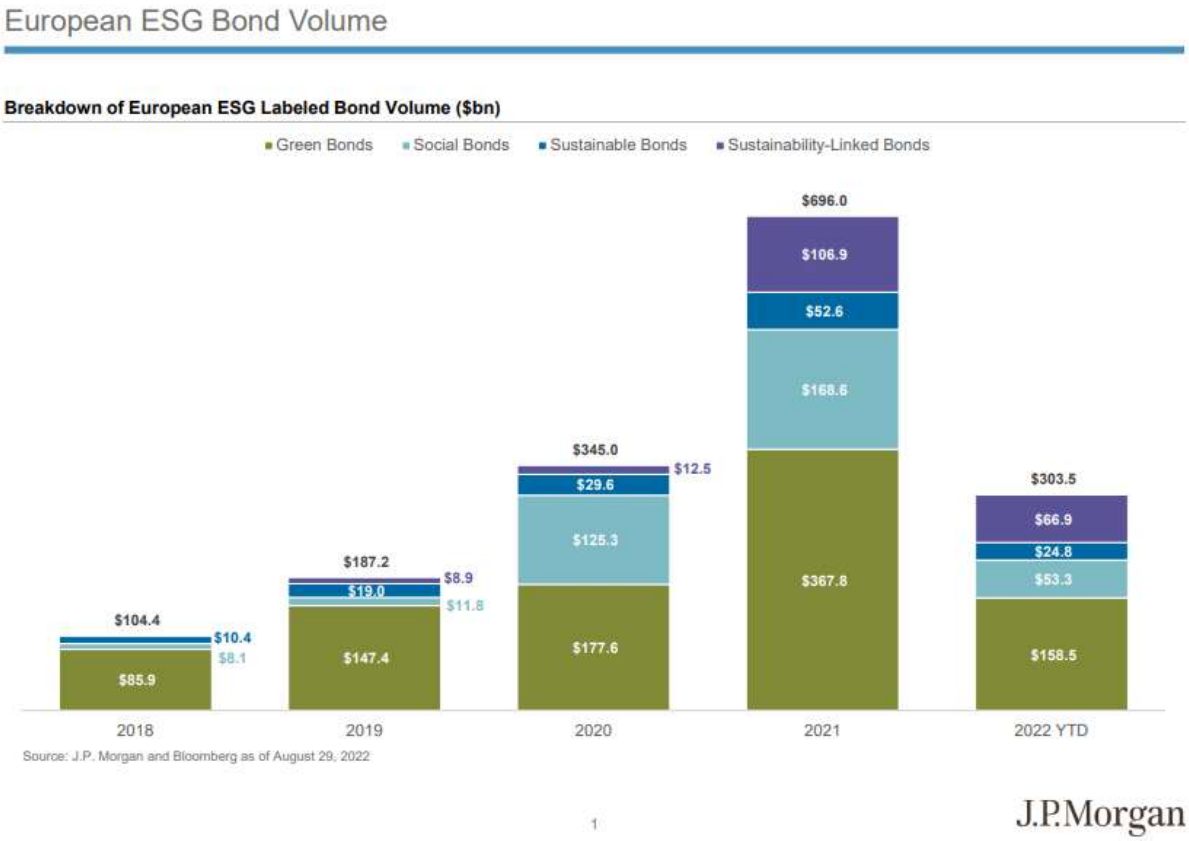
Rating agencies try to follow the main correlation among bond issuers, and they are now measuring the risk of bonds, correlating them to carbon emission rules.

According to (EBI) European Investment Bank website investors are more prone nowadays in tracking and measuring their portfolio performance they have being relying on sustainability benchmarks, credit rating agencies and market research services.

As per Busch, Ferrarini, and Grunewald (2021), credit ratings provide investors with information regarding the creditworthiness of private and public institutions and can include sustainability factors.

Chapter IV – The EU Green Bond Market

In the figure below, given by JP Morgan Brazil on 29 August 2022, we can notice a brief evolution of ESG Bonds issuance in Europe from 2018 to 2022.



We can see that the number of ESG bond issuance in the European Union market kept growing despite of the economic shocks we had such as the COVID Pandemic, pos pandemic period and the Russia x Ukraine war. Green bonds were the main relevant financial instruments issued among all ESG financial products, having increase from 85.9 bn USD to 367.8 bn USD from 2018 to 2021. The 2022 numbers are just considered for the first half of the Year.

According to the Financial Times report on July 2022, based on Moody's forecast, green bond issuance is foreseen to increase in the same number as compared to 2021. This is because this

market is really expected to grow more and more, as Governments are tightening and enforcing Sustainability policy's requirements and the expectation over ESG green bonds rising prices.

Still basing on the Financial Times report July 2022, we can see from the graph below that investors are really turning into a more responsible eco-friendly and social features. We can see that due to sustainability awareness, inflation and all problems occurring within the energy crises, most of investors had removed their money from conventional debt instruments in the market, enforcing a more demand for green bonds issuance in the future. So, we can expect the huge incentive in the European financial market for the green bond market share increase in the upcoming years.

Source: Financial Times website – July 2022

Green bond issuance this year is expected to be roughly in line with 2021. That is a notable slowdown, given how quickly the market has been growing and the effect of that growth on pricing.

However, having issued a total of USD 158.5 bn in green bonds during six months in 2022 Europe has been proving that is highly committed to sustainable financial projects, aligned to the Paris Agreement goals and the United Nations Agenda for 2030.

Green bonds are helpful for reaching the European Commission main ambitious; that is the EU New Green Deal making it possible for European Countries achieve a feasible net zero goal through carbon transition and become a reference worldwide within climate friendly area.

Furthermore, currently Europe is becoming each more reliant on green bond asset; increasing its market share and fomenting more and more Corporates and governments to engage deeply in this financial field as a measure to accelerate the pos pandemic shock to accelerate European recovery.

In addition, after Russia x Ukraine war that started in 2022, as we have been witnessing, the energy price is skyrocketing, and this is highly making pressure over Europe to accelerate their renewable energy industry. According to a report from The Economist magazine (July 2022) and based on the International Energy Agency forecast; the 2050 net-zero emission ambitious will need an average of USD 5 Trillion investments in renewable energy development. The green bonds are great tool to finance renewable energy as it is correlated to net zero, which is the main goal of the European new green deal.

4.1 – The EU Green bonds

As already commented in previous chapters, Green Bonds Market, which was created in 2007 by the European Investment Bank, has been growing very fast, having grown by 50% per year from 2015-2020; and becoming more popular if compared to other financial market instruments. In addition, the European Union has been incentive EU Countries to embark more intense in this market. According to OCDE (2016), the European Investment Bank (EIB), had issued a total of EUR 600 million Climate Awareness Bond in 2007. According to Deschryver and Mariz (2020),

In 2008, the first green labeled bond was issued by the world bank OCDE (2016), having issued around USD 300 million GB.

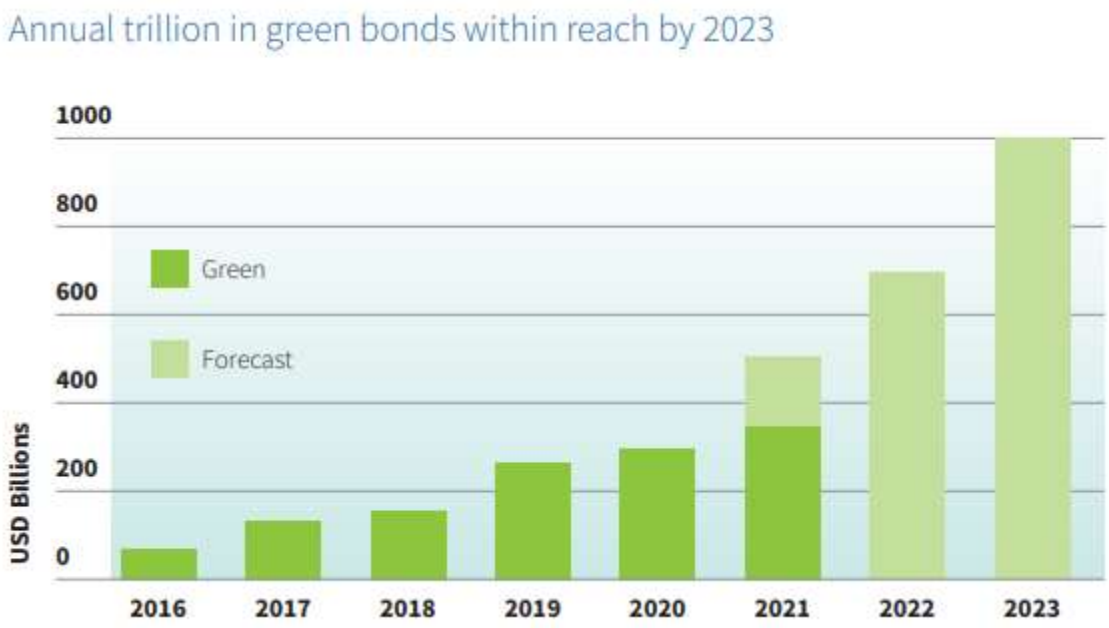
However, according to European Parliament report[4] Spinaci (2022), the green bond market represented just 3 to 3.5% in a worldwide context during 2020, which clearly states that this market needs to increase fast to achieve the Paris Agreement target.

Nevertheless, there has been strong pressure coming from the EU Commission that the European States must join themselves in a commitment to cut greenhouse gas emissions. As reported on Bloomberg; (2022), the EU parliament is enforcing greenhouse gas reduction through a stricter change in the EU carbon market reform and a more carbon cut speed.

As per World Bank, (2017), Investors' increasing demand was very important to the European Green bond market. This is mainly due to the fact that more and more investors are becoming aware of the correlation of climate risks to portfolio values. For example, a large number of pension funds invested through EU green bonds with ESG Criteria have been in demand since 2014.

European Parliament article states that it is predicted to achieve US$ 1 trillion of yearly global issuance by 2023. The table below, also taken by the 2021 climate bond initiative report, shows an average of green bonds issuance by year, which has been considerably increasing over the past few years, and it is predicted to maintain the increasing path until the 2023 period. In the figure below, we can see how green bonds have increased over the past years, as well as forecasted to 2023 doubling the in size.

[4] EPSR | European Parliamentary Research Service – January 2022 – European Green bonds, a standard for Europe, open to the world - Author: Stefano Spinaci – Briefing EU Legislation in Progress. Page 2.



Source: (Figure): Green bonds prediction – Source: Climate bonds initiative 2021.

Furthermore, as per CBI (2018), Europe has always been in the front of green bond issuance. Furthermore, considering the European Green Deal, the EU Commission believes that the private sector is fundamental to financing the green transition.

The Graphs below taken recently by the Climate Bond Initiative website enforce the evidence comprehending the period between 2014 to 2021 and how large green bond issuance gained importance and space in all Continents by year, especially in Europe. In 2021 we saw nearly an 40% increase in global green bond issuance compared to the previous year and around 96% rise compared to 2014. We can perceive that Europe has always reported the greatest amount in the Green Bond issuance market share.

Source: CBI; (2021)

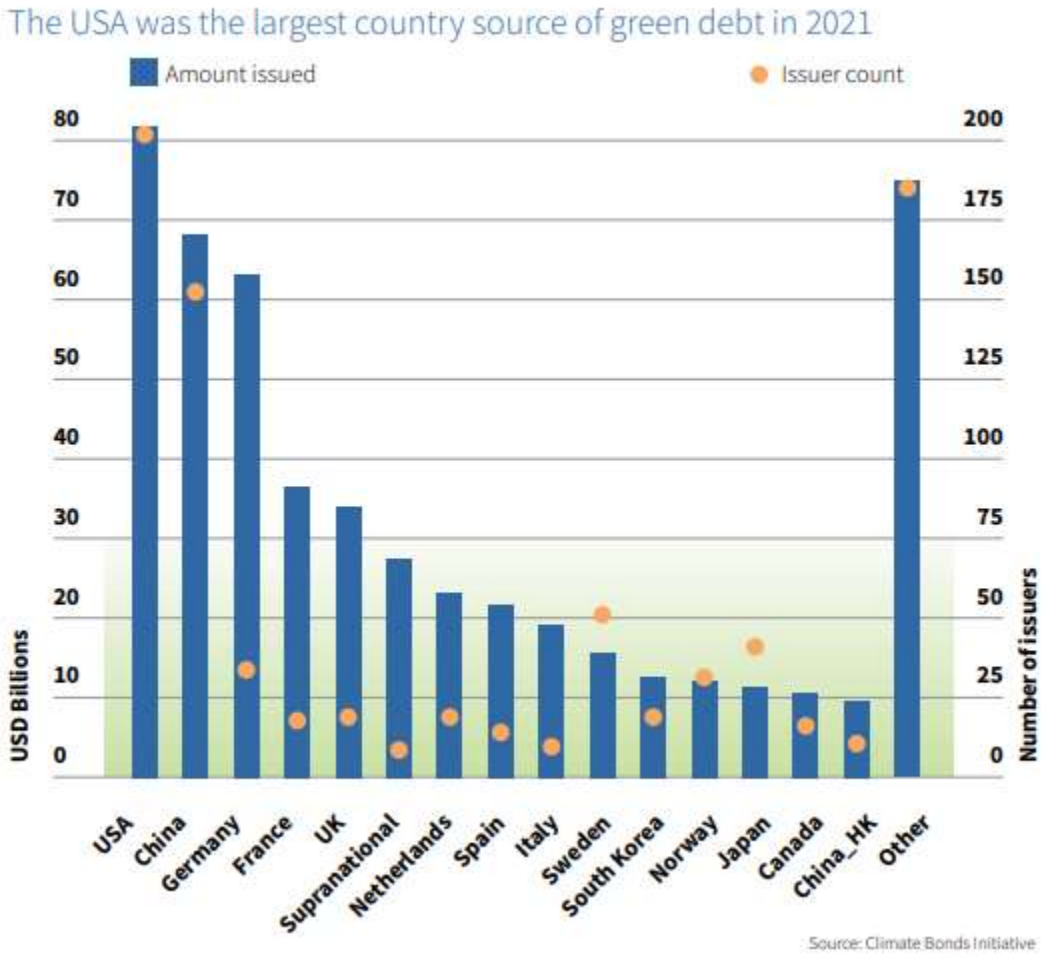
Currently, as per reported by CIB (2018), the European Investment Bank is the largest standard supranational green bond issuer with a strong commitment to EU taxonomy. Accordingly, to Climate Bond initiatives, Europe is one of the major in terms of GB issuance.

European countries have demonstrated a great evolvement in the GB issue, with Norway, the European country introducing the first stock exchange for green bond lists, and Luxembourg being the first country to host a green exchange. EBI website report that the European Union has been in these previous decades, increasing its participation towards a more ambitious climate plan. Panzica and Rancan (2021) state that these bonds had a 5-year maturity and used to be evaluated at 600 million Euros.

However, as per Maltais and Nykvist (2020), the green bond market, if compared to the entire bond market, is still just a small fraction. Nevertheless, it has been evolving in a fast way in these past few years.

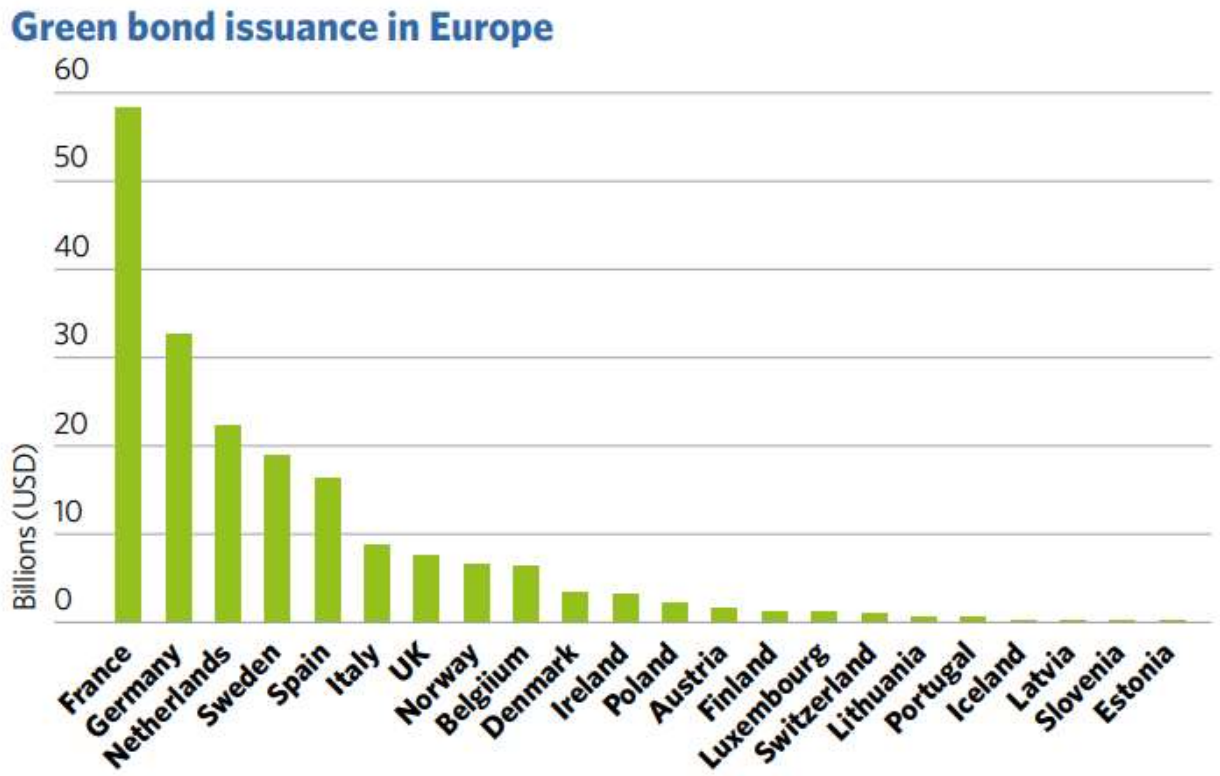
Freeburn (2020) states how far Europe arrived in this market, especially in 2019.

The next figure illustrates the 12 Countries with the highest average green-labeled bonds issuance. The United States appears with 63 % total. It went from USD 81.9 bn to USD 50.3 bn. The next is remarked by China (USD 199 bn), France, Germany, and Supranational ones. It is important to emphasize that in terms of region, we have the European Union as the leader in terms of green bond issuance (264,9%), followed by Asia Pacific; 129,5%. In the CBI (2021) report, we can see that Europe was, in fact, the striving region. We can notice the total issuance reaching USD 758 billion in the final 2021 year.



Source: CBI; (2021)

The figure below shows an example of green bonds issued by some European countries in April 2022.



Source: CBI; (2022)

Accordingly, to Climate bond initiatives 2021, France and Germany started GB issuance in 2012 and 2013, respectively, and they have been considered one of the European leaderships in the green bond market and one of the largest GB from a global perspective. In Germany, KFW development bank has a large contribution to issuing GB. France and Germany also account for a large number of certified climate bonds in Europe.

According to CBI (2021), the Netherlands had a remarkable GB issuance in 2016, mainly with the use of proceeds to better energy efficiency, including a better investment in onshore and offshore wind farms, solar projects, etc. It is important to highlight that the Dutch government is implementing measures to reduce half of the carbon emissions by 2030 through the replacement of natural gas with hydrogen.

In addition, as per CBI (2021) report, Belgium and Luxembourg also have high participation in the GB market. Luxembourg is recognizable for being the first place in Europe as the green stock exchange and has been increasing in the leading global approach to green bonds. Sweden accounts

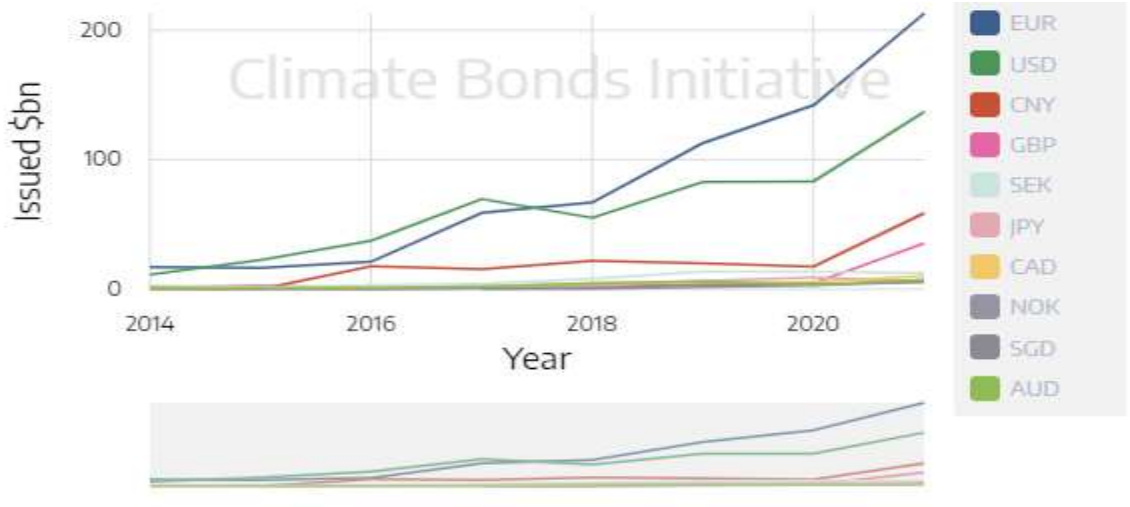
for the largest GB market compared to the Nordic countries, which came into force, especially after 2018.

Spain accounts for 2014 as the largest GB issuance related to energy companies. Likewise, Spain and Italian GB markets also started in 2014. Enel is the major energy company in terms of GB issuance. Italy has since 2017 pledging green finance as a top priority topic on its agenda.

Regarding Central and Eastern Europe, Poland is the leader in terms of GB market size, having more than half sovereign GB in comparison to CEE total volume, with proceeds allocated more to energy efficiency than Western GB European Countries. Followed by Poland, Lithuania is the second major sovereign GB issuer; Latvia is the third one in the GB market.

UK started embarking on the GB market in 2014 with Unilever company. Ireland intends to be part of a Green Bond hub.

It is important to state that the main GB is issued in EUR currency, turning European GB into the largest market. In the figure below, we can check the evolution of green bond issuance in terms of hard currency parameters. Most green bonds have been issued in EUR and USD currencies. Also, supranational Countries prefer issuing using one of these two currencies. As per CBI (2021), the European green bond market is considered a standard premium in terms of development, it is a trustable source reported by many investment mandates and advanced policy measures within financial markets. Therefore, most investors prefer adding to their green portfolio Bonds in EUR currency.



Source: (Figure) – Graph - Green bond issuance by hard currency – CBI Website

In the figure below it is possible to visualize the European GB issuance by European banks and EU non-financial entities, such as: Credit Agricole, KBN, NIB, KFW, EDF, SNCF Réseau, Engie, Iberdrola and Enel in EUR the major amount currency denomination. In addition, the major underwriters in Europe cooperating with GB issuance are Credit Agricole, HSBC, SEB, BNP Paribas, Barclays, Societe Generale, Dutsche Bank, Natixis, Santander and ING.

Top 10 green bond issuers

	Issuer Name	Deals	Outstanding (EUR)	First Issue
1	KfW	17	13.0bn	22-Jul-14
2	Republic of France	3	9.7bn	31-Jan-17
3	Iberdrola	10	7.4bn	24-Apr-14
4	Engie	4	6.2bn	19-May-14
5	TenneT Holdings	8	5.0bn	4-Jun-15
6	Credit Agricole CIB	101	4.3bn	25-Feb-13
7	Kingdom of Belgium	1	4.5bn	5-Mar-18
8	EDF	5	4.5bn	27-Nov-13
9	NWB Bank	7	3.7bn	3-Jul-14
10	Nordic Investment Bank	16	2.6bn	2-Feb-10

Source: CBI; (2018)

Table 1.3 Green funds in Europe: main players

Top 10	*Fund management company*	*Country*	*Number of funds*	*AUM (€ bn)*
1	Pictet AM	Switzerland	3	5867
2	BNP Paribas AM	France	10	5232
3	Amundi	France	8	2349
4	Blackrock	United Kingdom	5	1845
5	RobecoSAM	Switzerland	2	1392
6	Triodis IM	Netherlands	3	1114
7	ÖkoWorld	Germany	5	1016
8	ASN Bank	Netherlands	2	951
9	KBC AM	Belgium	6	842
10	Swisscanto	Switzerland	7	784
Total			**51**	**21,392**

Source: Adapted from Novethic (2018). Data on AUM (assets under management) refers to 2017

Source: (book The rise of Green Bonds in Europe; 2019)

As per CBI (2021) report, 2021 was a remarkable contribution from Europe to the green bond market as it was the continent responsible for around half of total volumes, a total of 265bn USD. European Green bonds corresponded to 50% of the market.

According to a CBI report (2021), Germany had increased 49% of its annual green bond issuance, which corresponds to USD 63.2 bn coming from German financial corporates. In terms of sovereign green bonds, the German government has proved its faithfulness to the sustainable finance market, taking the action of adding two more German sovereign bonds in the market, reaching a total of four sovereign GB in the market with a total amount of USD 11.5 bn.

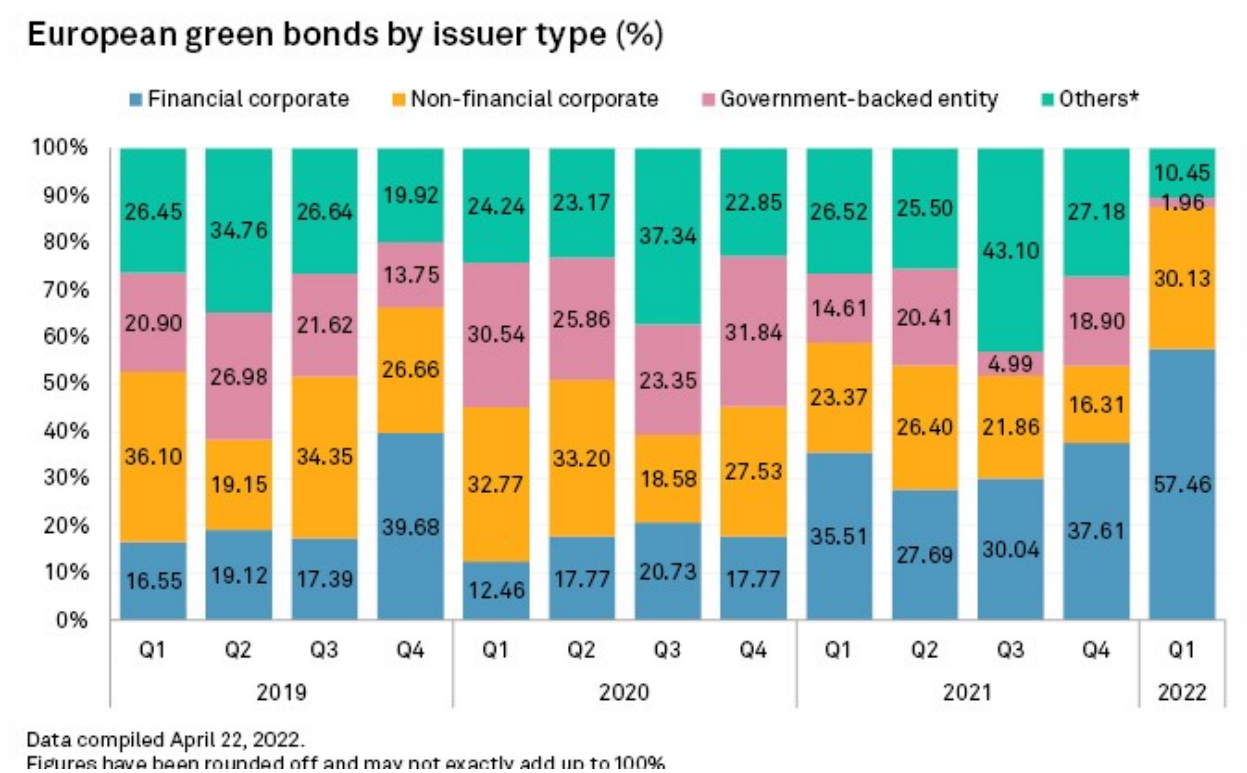
Still basing in CBI (2021) analysis, the European green bonds market is highly represented by France and Germany as the main GB providers. It is important to highlight the evolvement of the Asian continent's participation in the green bond markets in 2021, reaching a total of USD 129.5 bn having China Development Bank and ICBC issuing the largest green bond volumes in 2021, a total of (USD 6,5bn) and (USD4.5bn).

The financial sector is fundamental per the EU point of view as it is the sector feasible to reach a more suitable green transition due to its capability to join supply and demand green capital. The EU works, in fact, as the main provider of social and green funding.

Nevertheless, European GB issuers are larger in debt, currencies, and tenors' variety and count with a high standard evaluation regarding external reviews. European issuers are comprised of different sectors; non-financial corporates, Financial Institutions, Government-backed entities, local government and sovereigns, and ABS.

EU GB issuance is open to government & public bodies and financial and non-financial companies. It is important to highlight that the European Investment Bank is the largest standard supranational green bond issuer with a strong commitment to EU taxonomy.

In the table below, taken from S&P 500 in 2022, we can see the amount of green bond issuance by Entities from 2019 to 2021.

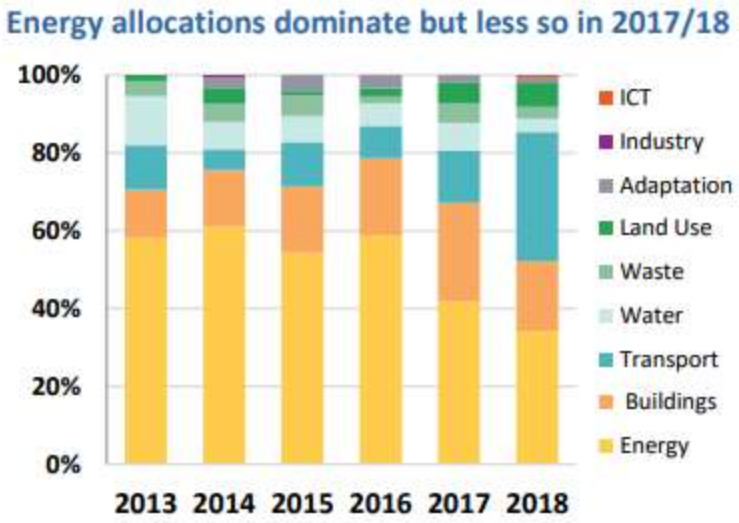


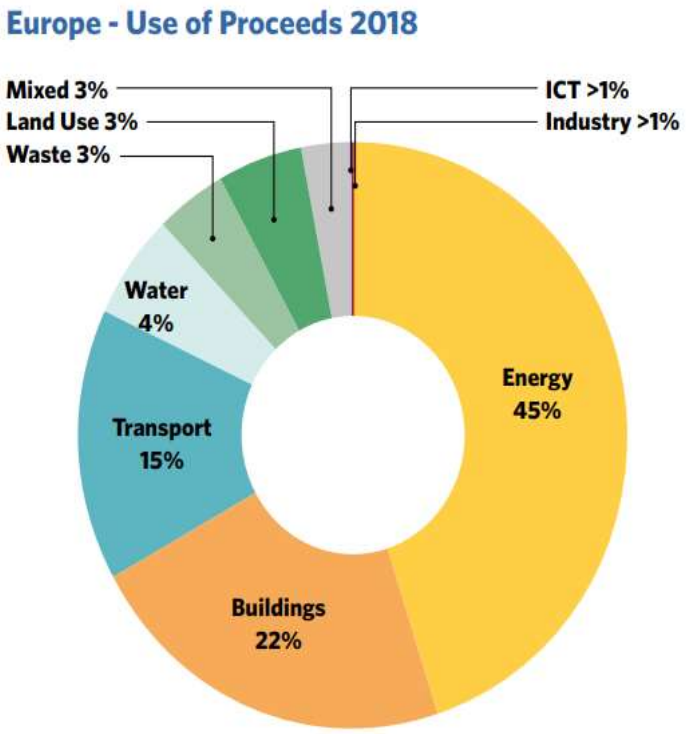
Source: S&P 500 website; 2022

Basing my analysis of CBI (2018), European non-financial corporates are mainly from two industrial sectors: energy and property. The relevant European companies in both sectors issuing GB are: "Iberdrola, Engie, TenneT Holdings, Enel, Innogy, Nordex, Gas Natural Fenosa, Senvion, Unibail-Rodamco, Vasakronan). In the financial institution, the leaders in GB issuance are Credit Agricole CIB (France), BerlinHyp (Germany), and KFW (Germany).

Regarding sovereigns, GB accounts for more than 40% of total cumulative issuance, having Poland during 2016 year, the first European country in the sovereign GB market. Later on, France and Sweden joined this market, contributing to enlarging the sovereign GB sector. It is important to highlight that France was the first country to issue municipal GB, whereas Sweden was the first to emit City GB.

We can see that even in Europe, the energy industry is the sector that most issues GB with an increase to transport industry as well, for instance, more investments in rail from Belgium, France, Spanish and Italy.





Source: Climate bonds initiative CBI; 2018.

In 2013 the Corporative world embraced this idea by joining the issuance of green bonds in the market. According to OCDE (2016), the first European Country that had the largest share of the corporate green bond was Sweden. As an example, in 2013, a large Swedish company called Vasakrona, in conjunction with a big Sweden bank called Sankinaviska Ennskilda Banken, issued a total of SEK 1.3 billion bonds. And this market kept growing in Europe has, almost tripled in

volume during 2016. For instance, as per OCDE (2016), 2014 was a remarkable year for this market in Europe, reaching a total of USD 36.6 billion GB in volume.

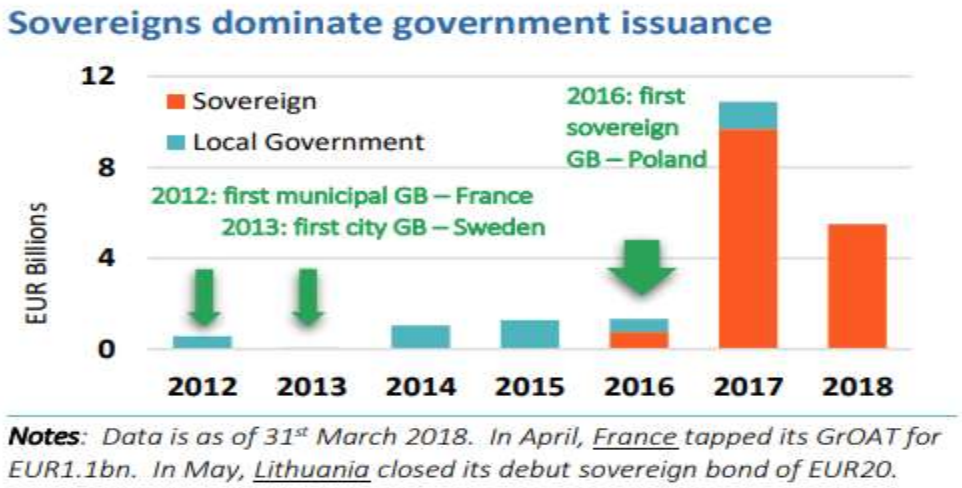
The figure below shows the first global GB issuers:

Global First	**Issuer**	**Year**
Green bond issuer	European Investment Bank*	2007
Public sector issuer	Kommunalbanken Norway	2010
Local government issuer	Île-de-France, France	2012
City issuer	City of Gothenburg, Sweden	2013
Corporate & property issuer	Vasakronan, Sweden	2013
Certified Climate Bond	Belectric Solar, UK	2014
Green covered bond	BerlinHyp, Germany	2015
Green MTN programme	Fabege, Sweden	2016
Sovereign issuer	Poland	2016

Figure - Source: CBI; 2018

Many companies and Governments, in particular insurance companies and banks, especially in the European Union, have been so far using these financial instruments to engage more in finding solutions and measures to tackle one of the most concerned worldwide issues; that is climate and its possible impacts of environmental risks. Per Tang and Zhang (2020), GB is rising yearly, and its concept is becoming broader. We had, for instance, the first sovereign GB issued by Poland and France in 2016 and 2017, and more countries are following these schemes. Later, we had the creation of the Sovereign Green Bond Club, which has been expanding, and more EU Countries have been joining Poland and France counterparts, for instance: Italy, Spain, Belgium, Lithuania, and Ireland.

Accordingly, to climate bond initiatives CBI (2018), Sweden was the first European country to issue non-financial corporate green bonds.



Source: CBI; (2018).

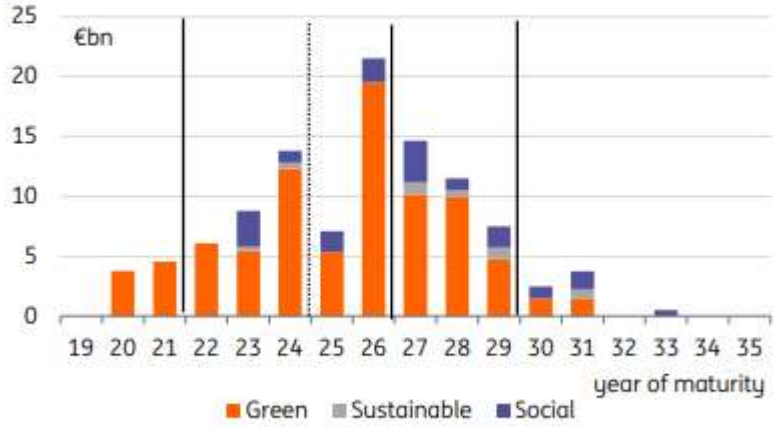
France and Sweden are the major local government GB issuers in Europe, followed by Norway and Switzerland. Luxembourg and London are the hubs of listing domestic and international bonds, including GB. France plays an important key in sustainability commitment.

Enel SpA Utility	GBP750m / 2.875 / 7y	Direct GHG emissions as of 31 Dec 2024 being above 140g/kWheq	25bps step-up if SPT missed Vigeo Eiris	Italy
JAB Holdings Investment Group (with focus on consumer goods and service companies)	USD500m / 4.500 / 30y	SPT 1: Reduce absolute scope 1 and 2 GHG emissions by 46.2% to 30.1 tCO2e by 2030 (2020 baseline) SPT 2: 95% of portfolio companies, by invested capital at fair value, to have SBTi approved targets by 2030 SPT 3: 100% of portfolio companies have at least 30% female representation in their non-executive board of directors by 2025	25bps step up if all SPTs not achieved, 5bps step-up if SPT 1 missed and 10bps step-up each for SPT 2 and SPT 3 Sustainalytics	Netherlands / **Longest Tenor SLB ever issued to date**
Wallenius Wilhelmsen ASA Shipping and Logistics	NOK1.25bn / 3mN+425bps / 5NCL	Reduce the weighted average carbon intensity of controlled fleet (owned vessels and long-term charter vessels under issuer's control) as measured by Carbon Intensity Indicator (CII) by 27.5% by 2030 (2019 baseline) **Applicable Interim SPT:** A minimum 10.1% reduction in carbon intensity by 31 Dec 2025 (2019 baseline)	Redemption Price increases by 150bps Cicero and Verification Statement by DNV	Norway
CapMan Private Equity	EUR40m / 4.500 / 5y	SPT 1: Approval of GHG emission targets no later than 31 December 2023 SPT 2: CapMan will integrate sustainability objectives into the variable remuneration of CapMan management group by 30 April 2023	25bps step-up per SPT (50bps total) paid April 2025 – 2027 ISS ESG	Finland / Inaugural issuance

Source: CBI; (2018).

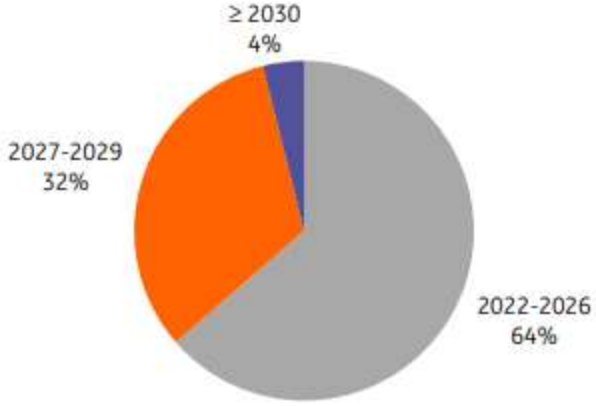
In the pie chart below, we can see the years to maturity on EU green bonds, which go from 5 to 10 years.

Fig 9 Sustainable bond redemptions by year (EUR sustainable non-covered bank bonds)



*Non-covered EUR sustainable bonds issued by banks (size ≥€250m)
Source: ING

Fig 10 Share of bonds maturing per TCS relevant bucket (EUR green non-covered bank bonds)



*Non-covered EUR green bonds issued by banks (size ≥€250m)
Source: ING

As per European Commission (2021), the EU has been striving in this market, showing global leadership. The EU issued around 51% of the total GB in the financial market in 2020. It is vital to remember that the euro currency is very attractive with respect to global green bond issuers.

Still, based on the European Commission (2021) information, the numbers for 2020 were around 49% of total GB denominated in euros issuance. Nevertheless, even inside the EU financial market, the total GB issuance represents just 2.6%, when compared to conventional bonds. So, despite the growing GB markets, this still needs to be more stimulated so that we can reach the United Nations Agenda and the EU New Deal by 2030.

In the excel table that we can find in the appendix, extracted from (Euronext Live Markets website) we can see an overview of Green bond issuance inside Europe in terms of issuers, amount, currency, and location from the period comprehended by 2012 to 2022.

It is important to emphasize that the EU has huge plans to use green bonds to finance its sustainability and that the EU has an ambitious plan to go deeper than the 2015 Paris Agreement.

In reality, the green bond market is an important instrument born within green finance, and it is taken into consideration by many responsible investors, financial entities, policymakers, and the European Union. Green bonds are a relevant source for economies to reach a pathway towards a more sustainable future.

As per European Environmental Agency, European Countries are making efforts to reduce 55% of greenhouse gases by 2030. Moreover, the development of renewable energies is essential to reach this goal. And it is where green bonds make an excellent contribution as it is powerful in canalizing capital flow to this kind of project. And Europe has been striving in this relevant subject.

4.2 - The European Central Bank incentive to EU Green Bonds

According to ECB (2020), the main role of the European Central Bank is banking supervision, monetary policy-make, economic analyses provision, and financial stability environment. On 22 September 2020, the ECB took an important decision associated with the 2030 Agenda by recognizing Green / Sustainability Bonds eligible for the central bank as collateral in credit and monetary operations. In other to be eligible, these bonds must be linked to some objectives created by the EU Taxonomy or from the United Nations Sustainable and Developing Goals.

In the paragraphs below, we can see the main duties of the ECB. And we can see the main duties of the ECB in the European Economy talking about the climate change risks.

Source: ECB-wide Climate Agenda (europa.eu) 2022

In the points below, there's a summary of each main ECB's duties related to climate change:

The EBC economic analysis and risk mitigation: Climate change does matter for the ECB as it recognizes that Global Warming can bring physical and transition risks which may occur in direct impact on macroeconomic indications, for instance: impairing inflation, curbing economic growth, causing financial instability, and so on. (ECB (2020))

To mitigate this risk, the ECB measures and monitors these risks in the EU Banking system in comparison to the whole financial system through a stress test. (ECB (2020))

ECB Monetary Policy: It is rich in risk assessment and feasible for monitoring climate risk exposures on the balance sheet of the EU. (ECB (2020))

ECB climate change center – Created in 2021. It has been coordinating climate change risks with the European banks. (ECB (2020))

In summary, the ECB considers itself in a role of contributing that the European Countries are achieving the perspective of a carbon-neutral economy which is also a benefit for price stability, inflation, and so on.

4.3 - EU Taxonomy

Created by the European Commission in 2016, through the European Commission's ongoing Action Plan on Sustainable Finance, the European Taxonomy is an important instrument guaranteeing credibility to this recent climate financial awareness bond. It certifies standardization for sustainable financial products and transparency of green bonds, which is based on a registration system and supervisory framework disposed of with accessibility and transparency for external reviewers. Green or sustainable taxonomy gives a clear definition of what is really "green" or what makes a bond "green," avoiding greenwashing incentives. The European Taxonomy brings more confidence to investors as green bond issuers are supposed to accomplish specific criteria that are linked to a greener real bond.

As sustainable finance has been gaining more importance every day alongside the EU seeking a more sustainable investment plan perspective and considering that the green bond markets are still surrounded by uncertainties and lack of transparency; the European Parliament embraced the importance of regulating this market through a more EU standardization on green bonds issues.

For the (TEG), EU Technical Expert Group on sustainable finance and authors Deschryver and Mariz (2020), the European Union green bonds need to meet the following requirements: GB issuers must be aligned to EU GB standards and GBP principles. In addition, the use of proceeds needs to exclusively be toward finance or re-finance green projects. Lastly, the EU-Green Bond standard needs to be verified by an accredited external party.

According to (European Commission), Article 20 of the Taxonomy Regulation it is stating the platform on sustainable finance is composed of experts called advisory body from the private and public sector that advises the Commission performing a technical screening criterion for the EU Taxonomy for EU1NBSP Taxonomy and sustainable finance. That makes it clear that EU green bonds are based on the taxonomy.

Based on CBI (2021) report, the EU Taxonomy has several criteria stages, but the most important are the first and second stages, which are oriented toward climate change mitigation and adaptation measure. The overarching Taxonomy Regulation and the Climate Delegated Act were approved in 2021.

Overall, taxonomy requires green instruments to be certified, checked, and approved by external reviewers, following the four points of GBP, which result in a more confident linkage environment between general investors and issuers. Taxonomy Regulation is a way to deviate investors from stranded assets; in other words, it is an opportunity for investors to visualize the corporations and entities financing unsustainable economic activities.

According to (European Commission), by the end of 2019, the EU green deal signal need for incrementing direct capital flows to green investments. In the following year, it was created the European green deal investment plan by the EU Commission. This proposed Regulation is positively viewed by companies and public authorities as investors and issuers aligning to EU Taxonomy, and they can prove their investments are trustable in terms of sustainability, and it has reduced greenwashing risks.

The EU Green bond standard is a legislative initiative by the European Commission created in 2020. As per European Banking Institute website EBI (2021), by the end of 2019, it was launched the European Green deal by the European Commission in other to tackle climate and environmental-related challenges. Accordingly, to the EU Parliament article and author Spinaci (2022), in 2021, the European Commission took an advance step on the European Green bond market Regulation, presenting a proposal to the European Parliament for a tighter Regulation of GB. This great step gave incentive to an EU green bond standard which is now recognized as EU GBS, enforcing EU taxonomy, and embracing action plans and strategies for sustainable finance. In this perspective, the green deal goes in accordance with the UN 2030 Agenda and the UN sustainable development goals.

The article from ING (2021) exposes the EU green labeled usage to benefit issuers and investors in terms of short time horizon as it guarantees EU green bond status until maturity.

Busch, Ferrari, and Grunewald (2021) state that the European Commission has recently established a platform on sustainable finance, consisting of private and public advisory body experts giving the EU a more advanced step in GB analysis. These experts are driven to advise the European Commission based on four main tasks such as the usability of EU taxonomy related to technical screening criteria, reviewing the taxonomy Regulation and providing information regarding sustainability and social objectives that highly impact the environment; and finally, reporting the pace of capital flows that is canalized to sustainable investments.

The EU is highly committed to correlating the linkage of EU green bonds to EU taxonomy procedures, creating a standard for green bonds stimulating green bonds' main purpose, which is to finance the green transition. Maltais and Nykvist (2020), highlight that the European Commission drives forces to encourage the taxonomy principles on GB. To reinforce this fact, the ING (2021) report states that the European green bonds are fully aligned to taxonomy until bond maturity.

In the EU, GB issuers need a detailed environmental impact report, including information and methodology used to impact calculus; and a minimum of one report by the time it reaches the bond proceeds allocation.

As per ING (2021), European GB's main goal is to support GB issuers to make the low carbon transition as it is prone to finance longer-term projects aligned to EU taxonomy Norms. European GB issuers need to demonstrate an external review positive opinion by pre-issuance time. Regarding the post-issuance period, issuers must keep on reporting year by year the allocation of proceeds and its alignment with the EU GB Regulation. This is reported through the European green bond allocation report, and it is also reviewed by an external review.

Through the EU Commission's ongoing Action Plan on Sustainable Finance, there is a Legislative constituent body creating proposals to make it easy for the capital to flow towards more sustainable investment. According to CBI (2021), The EU Taxonomy goes further on green bonds and highly reinforces mandatory disclosures supporting and protecting investments and assets by banks, investors, and EU corporates from climate change's main risks and greenwashing.

The environmental characteristics incorporated by EU Taxonomy TEG (2020) are the following six:

Source: (TEG; 2020)

However, as EU Taxonomy is not yet compulsory, The European Central Bank (ECB) also stresses the weakness of the market as the standardization created by the EU taxonomy is not yet compulsory and seeks to implement the vision on the importance of turning the system mandatory for the new entrants even though recognizing the difficulties in implementing this, but certain that this could help the better growth of European Union Green Bonds markets.

According to TEG (2020), for a company to be considered eligible under EU Taxonomy, it must follow the procedure below:

Source: The five-step process of determining EU Taxonomy alignment. Adapted from TEG (2020) FULLTEXT01.pdf (diva-portal.org)

As per CBI (2022), In July 2022, we had the European Parliament delegating the CDA, that is, Complementary Delegated Act, to the EU Taxonomy Regulation. With this step ahead on the EU Taxonomy, fossil fuels and nuclear energy source is supposed to be considered from 2023 as transitional activities turning these industries sector the necessity to incorporate in their value chain a renewable profile infrastructure between 2030 to 2035. This is required to meet a reduction of 55% GHG by 2030.

The EU taxonomy will help to enlarge more investors in GB markets, as it guarantees more confidence to governments and companies to make more use of GB. With the prediction increase of GB, this will help increase the EU financial markets in terms of more correlation to sustainable finance.

4.4 – EU Green Bond Market volumes

As per CIB (2021), after 2007, a variety of green bonds emerged in the financial market, having 2014 an uprise appearance in the market. The authors Maltais and Nykvist; (2020) opinion that GB is a very prominent financial innovation around sustainable finance. Deschryver and Mariz; (2020) describe in their paper that during 2018 green bonds kept strong in the market with a total issuance of USD 167.3 billion.

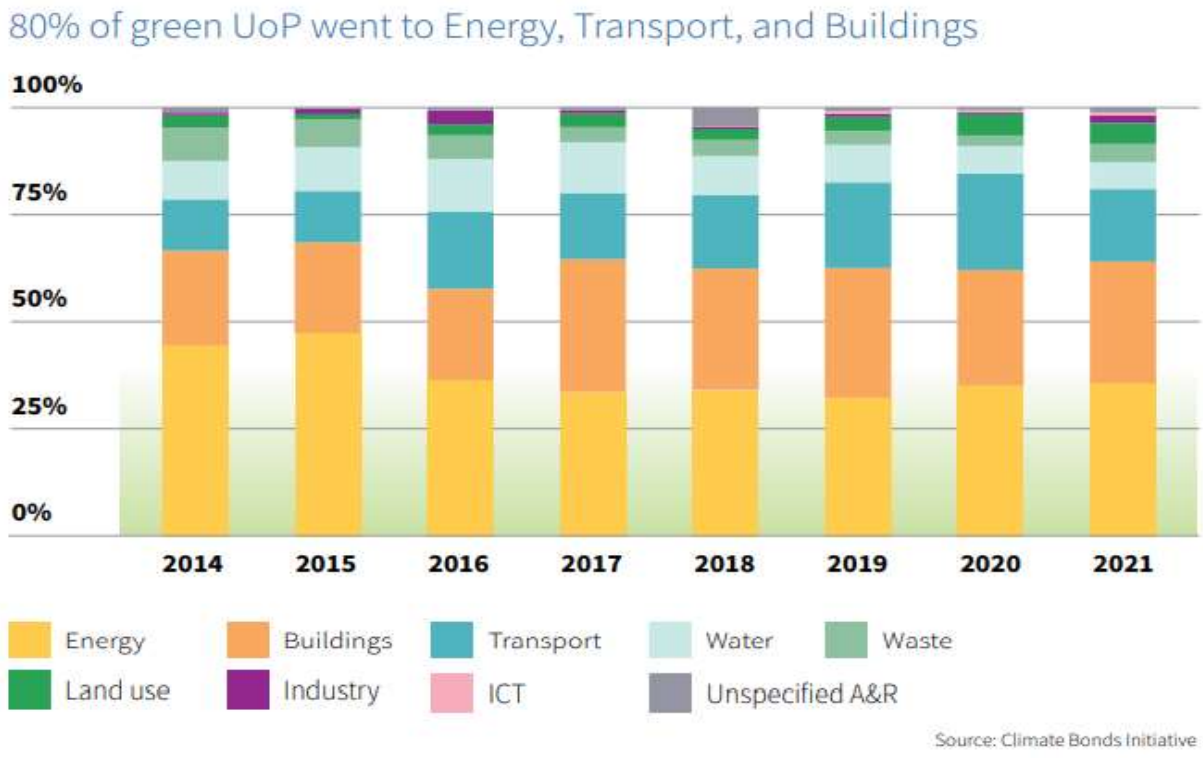
Migliorelli and Dessertine (2019) complement the idea that GB's increasing issuance is hand in hand with sectorial diversification aligned with a large variety of products.

Freeburn (2020) shows that during 2019 non-financial corporates, financial corporates, and government-backed entities were responsible for 23, 21, and 15 %, respectively, GB issuance. He

also highlights the major participation of Europe in this market. In Freeburn's (2020) paper, we can see the importance of growing participation from underwriters in the European green bond market. For instance, the author states that in 2019 one of the biggest underwriters of GB in the market was Credit Agricole issuing an amount of USD 10.6 Billion, followed by BNP Paribas and HSBC. These three European Banks contributed 17 percent of the total GB underwrite market share in 2019.

Deschryver and Mariz (2020) argue that in 2019, green bond issuance reached USD 100 billion, and this market keeps growing in number issuance.

In the figure below, taken from CBI (2021) we can check that the largest use of proceeds from green bonds was in the energy, building, and transport sector, a total of 81% in 2021. In addition, non-financial corporate issuers were the strongest supporters of the Energy and transport sectors, while financial corporates were more towards supporting the building sectors.



Source: CBI; (2021)

GB is also growing rapidly among worldwide corporations. As reported by Flammer (2020), after 2013, the growth pace started rising. And the sector that had the most issued this kind of bond was the industrial sector, especially within European Union. One of the reasons we find that direct impact on the environment is high within industries is because it is a source of industries operation.

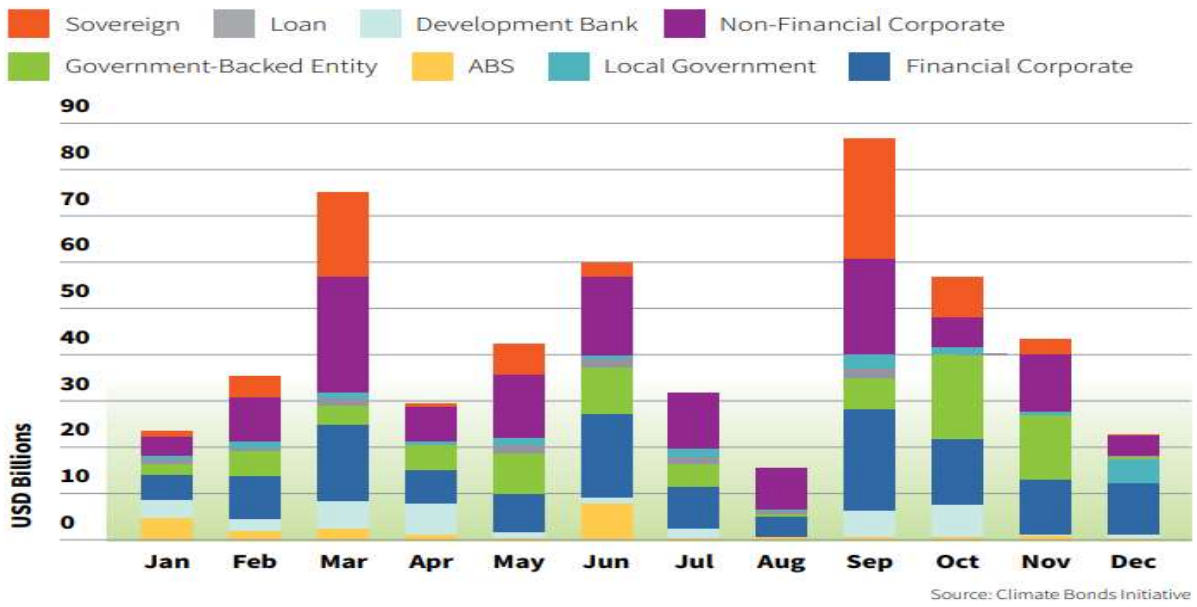
From the table below, we can see that the highest emission of Corporation GB comes from the industry sector. We can see that since the green bond's beginning in the markets, most of European countries have been taking a great percentage of market share concerned to participation.

Country	# Bonds	$ Amount (billion)
China	190	75.1
Netherlands	46	33.2
United States	194	31.5
France	157	30.8
Germany	57	19.4
Mexico	9	12.2
Sweden	140	11.6
United Kingdom	25	10.8
Luxembourg	20	8.9
Spain	17	7.6
Hong Kong	31	7.4
Japan	37	6.7
Australia	15	5.4
Italy	10	4.6
Norway	20	4.4
India	17	4.2
Brazil	6	3.4
Canada	10	3.4
Denmark	4	2.1
Austria	5	1.7
South Korea	5	1.7
United Arab Emirates	3	1.6
Taiwan	21	1.6
Singapore	10	1.2
Others	140	10.9
Total	1189	301.2

Source: Flammer; (2020)

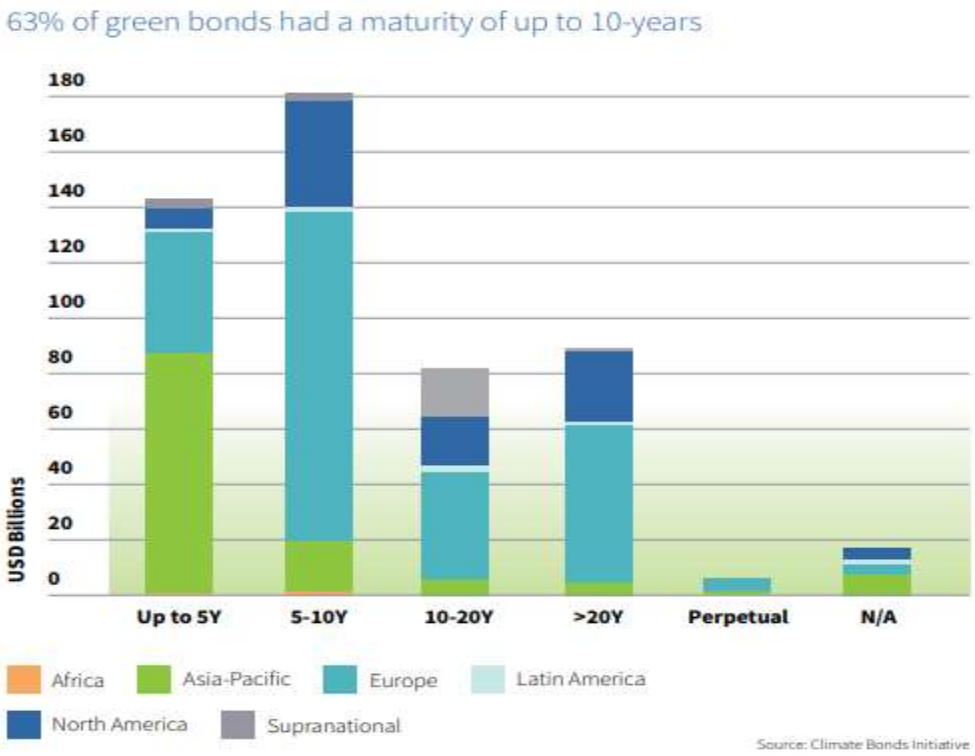
Focusing on the EU, EU GB issuance is opened to government & public bodies and financial and non-financial companies.

In the next figure, it is possible to check the GB issuers that most collaborated within this market in 2021.



Source: CBI; (2021)

The Green bonds have, in the majority, 5 to 10 years of maturity. The figure below taken by the Climate Bond initiatives shows it.



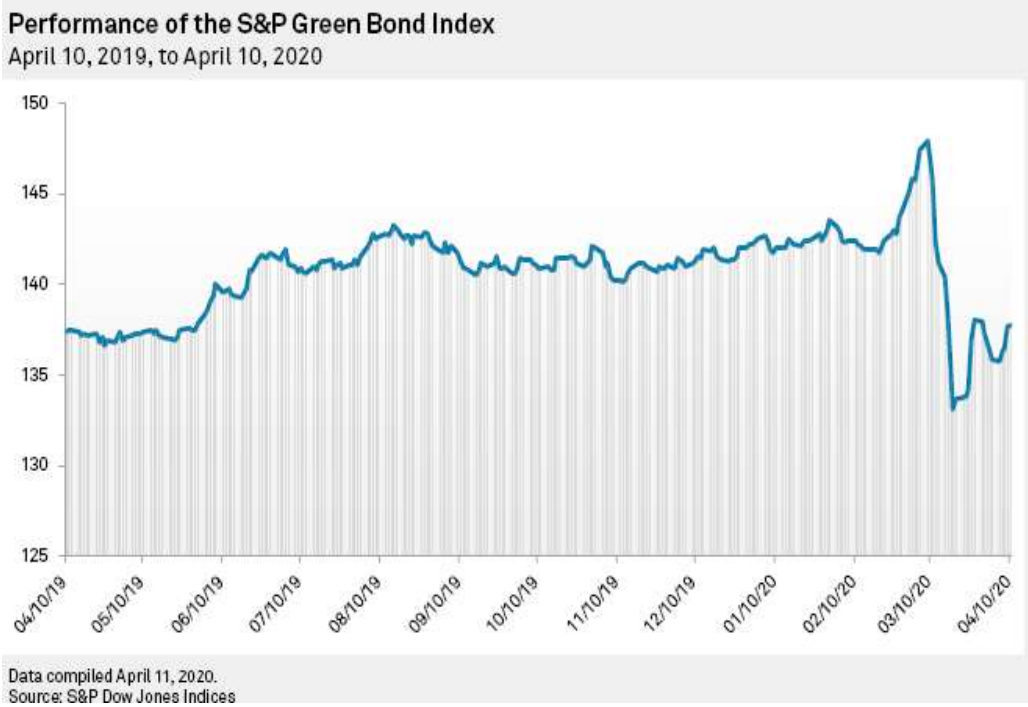
Source: CBI; (2021)

4.5 – COVID 19 and effects on EU Green bonds.

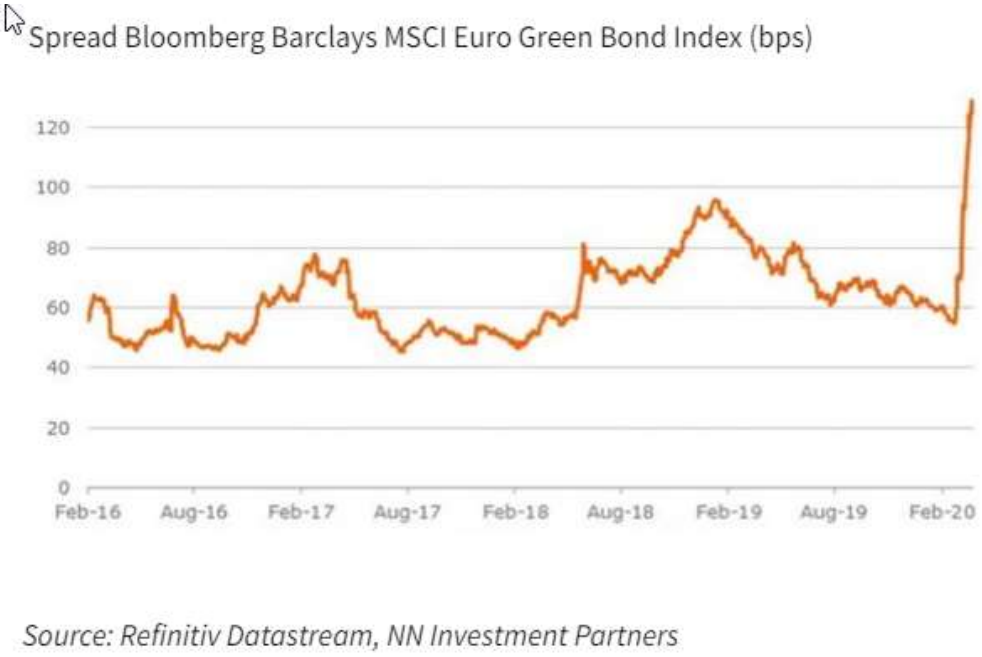
After a great year of GB issuance occurred in 2019, GB was also not immune to coronavirus shock. Green bonds were temporarily quiet in this period due to market stress and volatility. However, according to Euromoney website (2020), the total GB issue was reduced from $15 Billion in January / February 2020 to $ 1.8 Billion in March 2020. Nevertheless, as per Euromoney website; (2020) *"green bonds index lose 5%, compared to 11% broader corporate index"*. (Euromoney website (2020))

According to Cicchiello, Cotunga, Monferra, and Perichizz (2022), after the COVID-19 outbreak and especially during the European Countries' lockdown, the major necessity for companies and governments was to tackle the healthy structural shock letting aside the green projects.

The table below from S&P 500 in April 2020 shows the performance of the green bond index during 2020. In addition, as per Wealthbriefing website (2020), the spread of the EU Green bonds market has increased after Feb 2020.



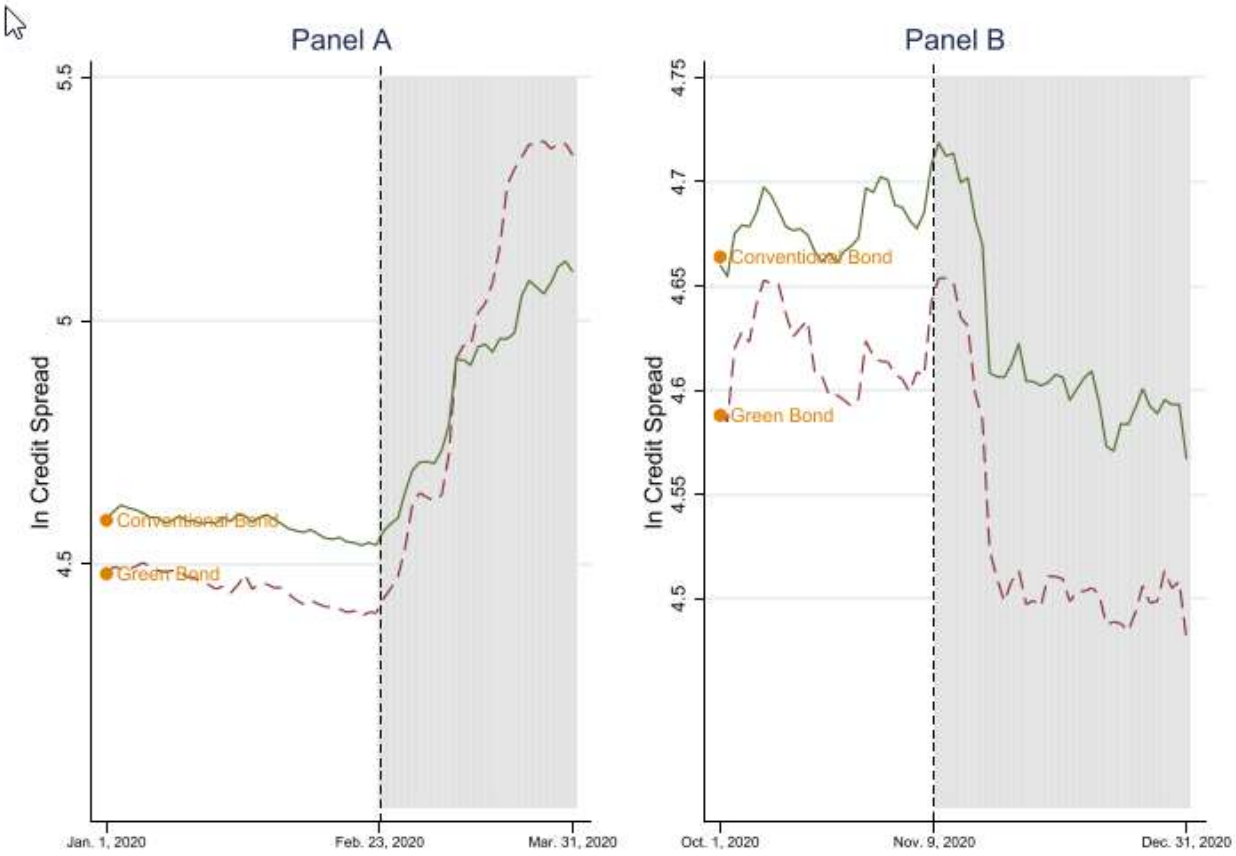
Source: (Wealthbriefing website; 2020)



Source: (Wealthbriefing website; 2020)

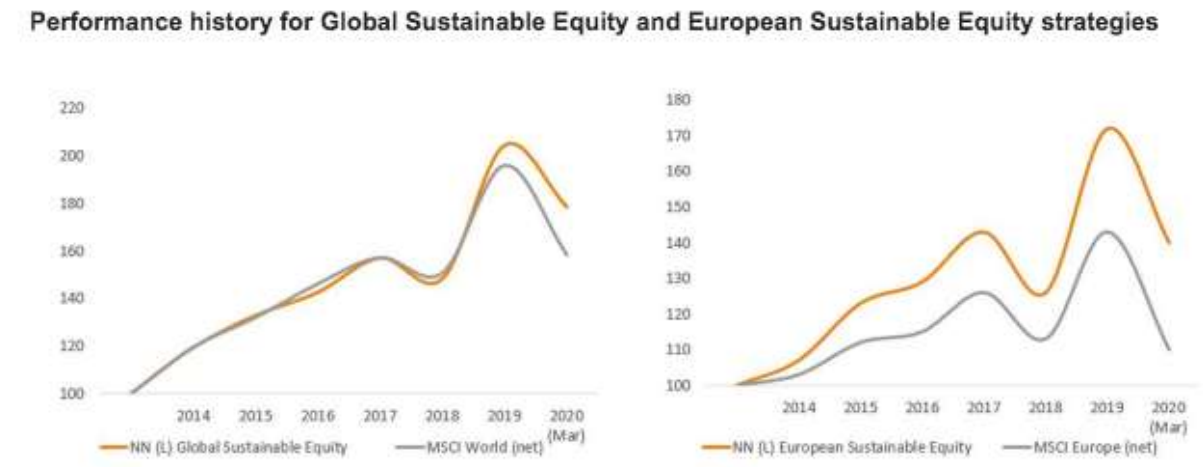
However, Cicchiello, Cotugno, Monterra, and Perdichizz (2022); bring the information that Green bonds credit spread increased in the first half of 2020 and started decreasing in the second half of

2020 after the announcement of the COVID vaccine efficacy by BioNTech, demonstrating its ability to make a profit.



Source: (Cicchiello, Cotunga, Moferra, Perdichizz; 2022)

The graphs below taken from the Fixglobal website (2020) show that green and conventional bonds performance take a different performance between Global and Europe at the beginning of the pandemic period. We can perceive that sustainable equity was able to recover, especially in Europe, which had outperformed its benchmark.



Performance of sustainable equity funds. Source: NN IP.

Source: (Fixglobal website; 2020)

In the graph below taken by CBI (2021), we can see that in the pandemic period of 2020, European countries had performed great in issuing high amounts of GB, having Germany (USD 40.2 bn), France (USD 32.1 bn), and the Netherlands (USD 17.0 bn), Sweden (USD 5.6 bn) taking the EU leadership. The use of the proceeds was mainly destinated for the energy sector.

Top 20 Countries for Annual Green Bond Issuance

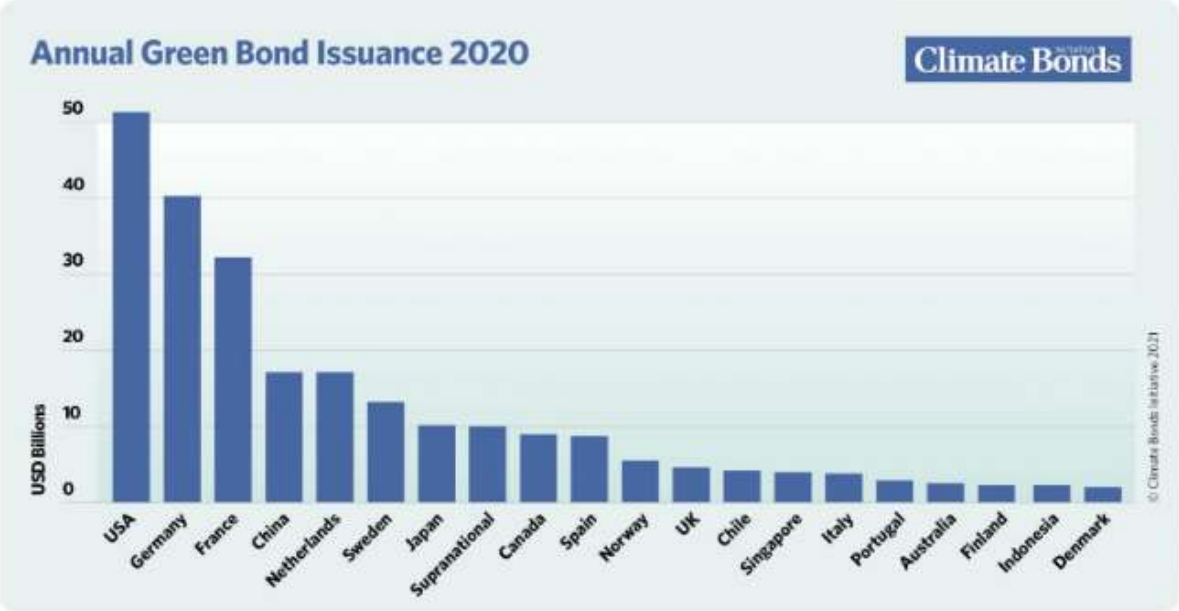
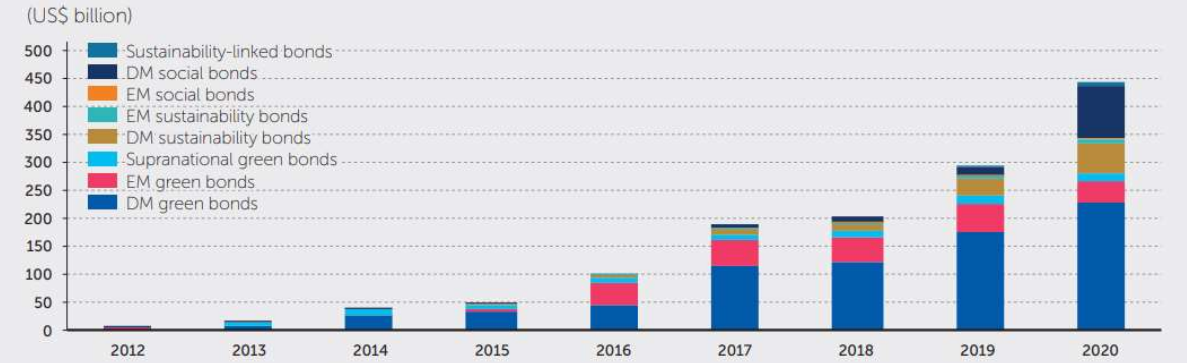
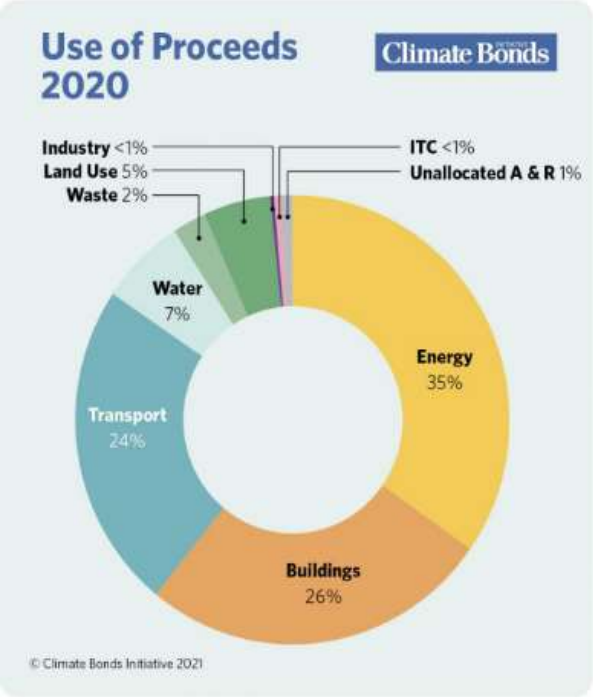


Figure 1 - Global ESG Thematic Bond Issuance

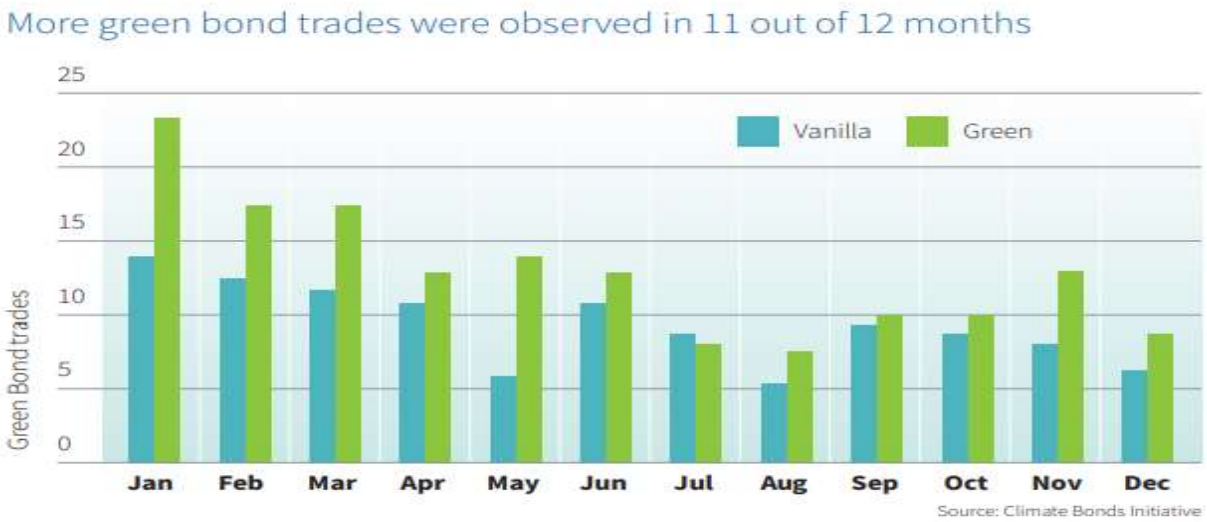


Source: IFC, Bloomberg, Environmental Finance, Climate Bonds Initiative.

Source: CBI; 2021.



In the figure below, from CBI; (2021), report we can see the comparison between conventional and green bonds trade within Europe. Despite the turbulent market caused by the pandemic, the green bonds' monthly average trades were higher than vanilla bonds.



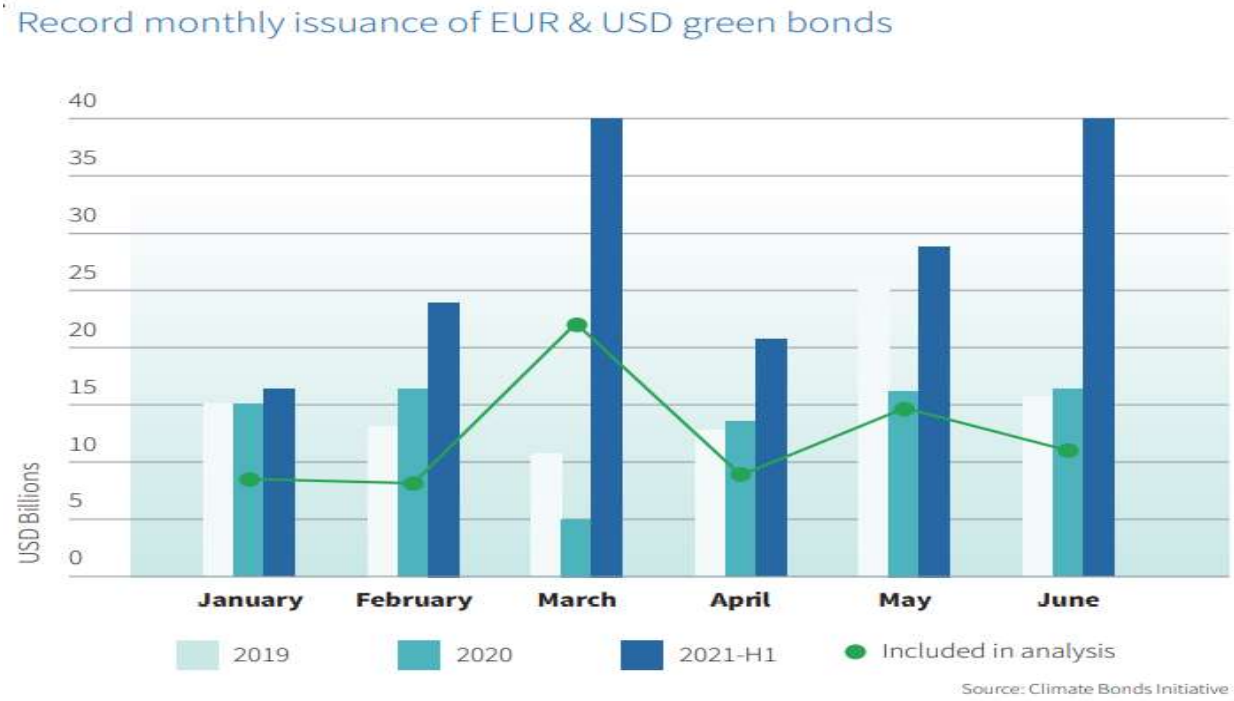
Source: CBI; (2021)

4.6 – POST-COVID EU GREEN BONDS

This proves that investors show confidence in green bonds despite the coronavirus outbreak. In fact, as authors Cicchiello, Cotugno, Monferra and Pedichizz (2022) highlight, that human beings perceived during the COVID-19 pandemic lockdown how negatively we were impacting the environment. When we stopped our activities for a couple of weeks due to the lockdown, we had perceived how clean and pure the atmosphere of many polluted cities became. Hence, this reality increased attention from investors how green products is feasible to impact positively on economic recovery in the post-COVID as it foments green investments.

In 2021, during Post covid period, there was a concern among investors regarding the possible inflationary outcomes. Nevertheless, the European Central Bank kept supporting the European economies, making it possible to keep a low-interest rate.

In the figure below also taken from CBI (2021) report, we can notice that in terms of green bonds, supply and demand have kept growing in Europe in the first half of 2021. It is important to mention that a great number of EU Sovereign green bonds gained momentum in this Pos COVID era.

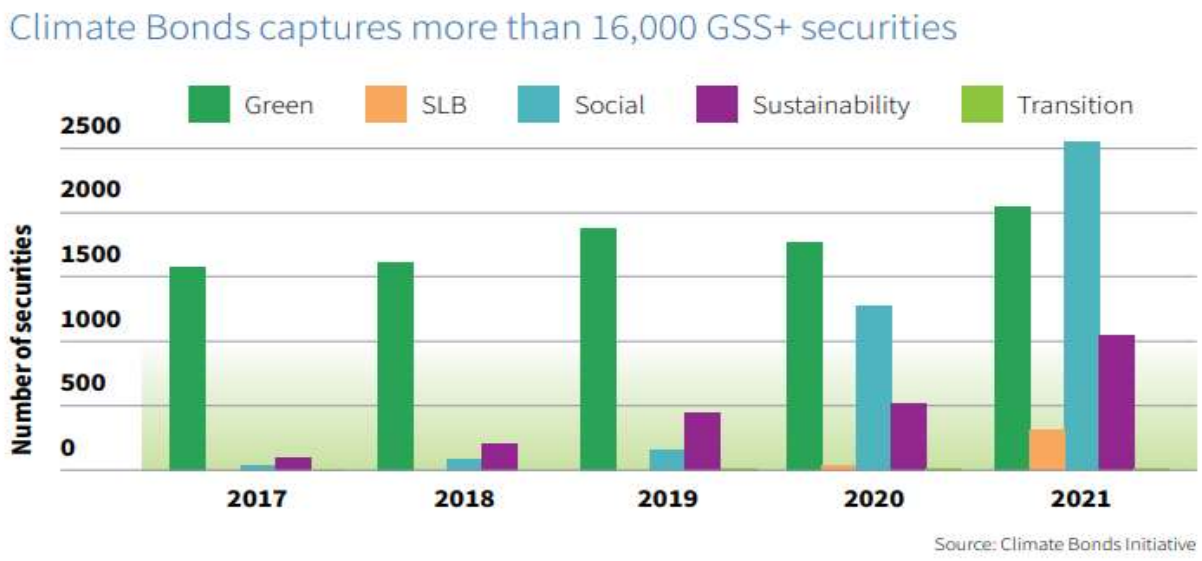


Source: CBI; (2021)

	France	Germany
H1 2020	France 0.5% 24/06/2044	Germany 0% 15/08/2050
Pricing Date	16/03/2021	11/05/2021
Tenor	23 Years	29 Years
Original Size	EUR7bn/USD8.3bn	EUR6bn/USD7.3bn
Size as of 30/6/2021	EUR9.3bn/USD11bn	EUR6bn/USD7.3bn
Total green bonds		
Number of bonds	2	3
Total size green bonds	EUR38.2bn/ USD42.1bn	EUR17.5/USD20.9bn
% total sovereign debt*	1.8%	1.2%

Source: (Climate Bond Initiatives; 2021) – The 2 majors European Countries in terms of Sovereign green bonds in the Covid and post covid Era.

As per CBI (2021) report, In 2021, the GB market had skyrocketed, broking through the half trillion market, surpassing USD 1.6 trillion GB, gaining more and more momentum in terms of volumes and security numbers.



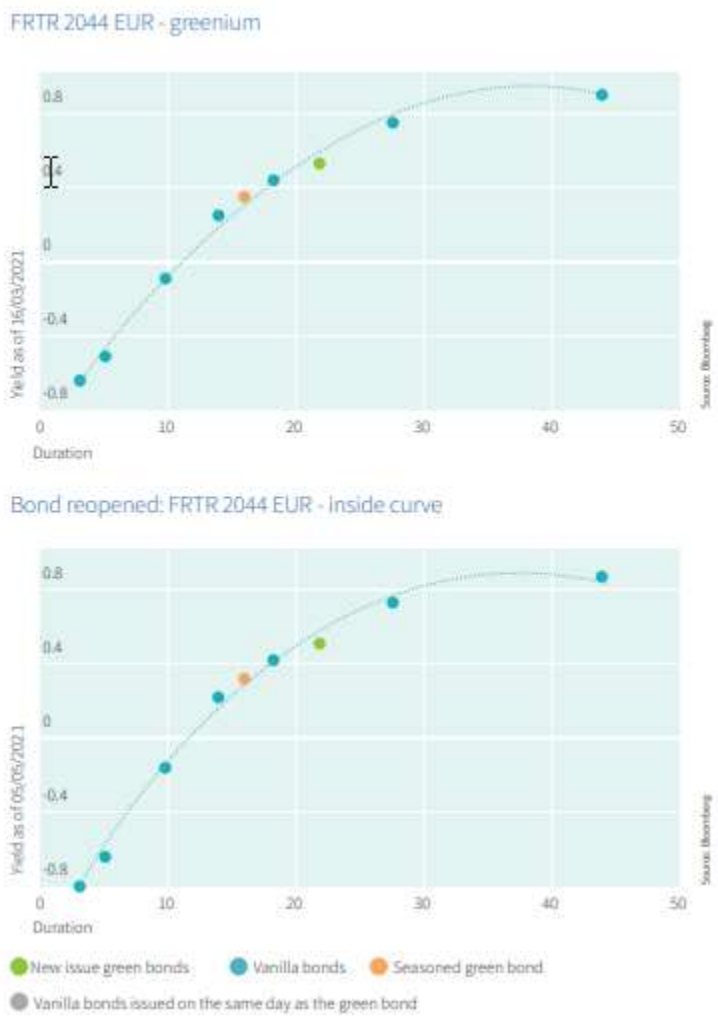
Source: CBI; (2021)

In the graph below, we can see that in September 2021, a period where we had energy price pressure due to inflation post-covid-19 period. This was the period of the year with the largest amount of GB issuers in the market, especially from the private sector, reaching over around USD 90 billion.

Source: CBI; (2021)

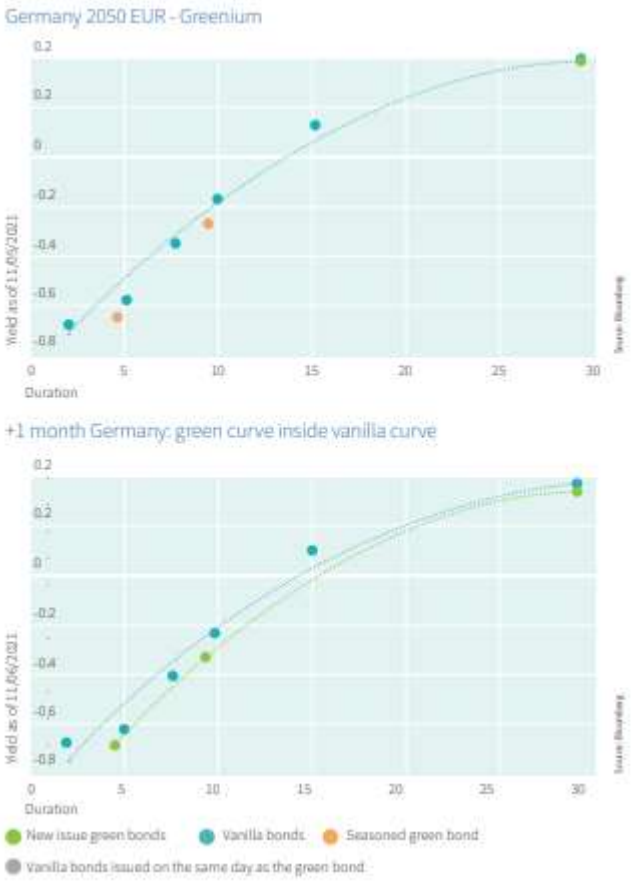
"Fitch Ratings noted that green bond fund assets under management (AUM) had increased by 80% year-on-year to reach EU22bn (USD26bn) at the end of Q1 2021". (CBI (2021)) *"The ECB remains the largest buyer of EUR denominated bonds including those labeled green."* (CBI (2021))

As highlighted in CBI (2021) article, France is very committed when it comes to sovereign green bond issuance, providing investors great liquidity to GB, being possible to trade inside the yield curve, as demonstrated in the graphs below:



Source: CBI; (2021)

In addition, in CBI (2021) report, we can see that Germany launched another green bond of considerable size of EUR6bn in May 2021 with a maturity of 2050. The graphs below show that over the 30 years, German green bonds maintained a low yield of around three basis points when compared to conventional Bonds.

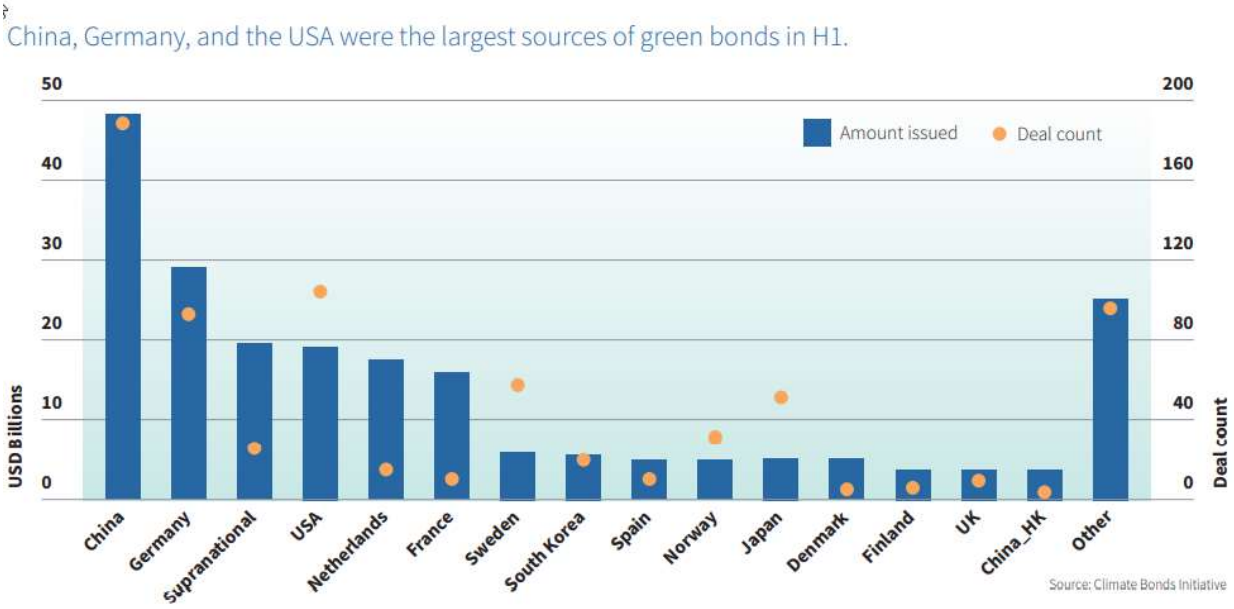


Source: CBI; (2021)

4.7 - Russia x Ukraine war effects on EU Green bonds.

In February 2022, the Russian invasion of Ukraine put the world on alert, especially in Europe, because it could demonstrate how deeply reliant these countries still are on energy from the fossil fuel sector. With the economic sanctions implemented toward Russia as a penalty method and considering that Russia was the primary supply of gas and fuel to Europe, it immediately responded by cutting and reducing natural gas supply to some European Countries, which incurred a sudden price volatility increase and energy stock security concern.

Aligned with the impact of the Russia x Ukraine war is the post-COVID inflation shock which impacts the bond market functioning. According to CBI (2022) report, in 2022, the pace of green bond issuance in the first quarter started declining compared to the same period in 2021. However, in H2 2022, the movement of green bond issuance started rising, especially in June 2022. In the figure below, we can notice the top GB countries during the Russia x Ukraine war period. In terms of the European Union, Germany, the Netherlands, and France keep the greatest issuance share.



Source: (Climate Bond Initiative, CBI; (2022)

Top 10 Green issuers in H1 2022

Issuer Name	Country	Amount issued (USD)
European Union	Supranational	11.80bn
Bank of China	China	8.13bn
Federal Republic of Germany	Germany	7.83bn
Republic of France	France	7.47bn
EIB	Supranational	5.57bn
Dutch State Treasury Agency	Netherlands	5.23bn
China Development Bank	China	4.26bn
ICBC	China	4.17bn
TenneT Holdings	Netherlands	4.06bn
China Three Gorges Corporation	China	3.68bn

Source: (Climate Bond Initiative, 2022)

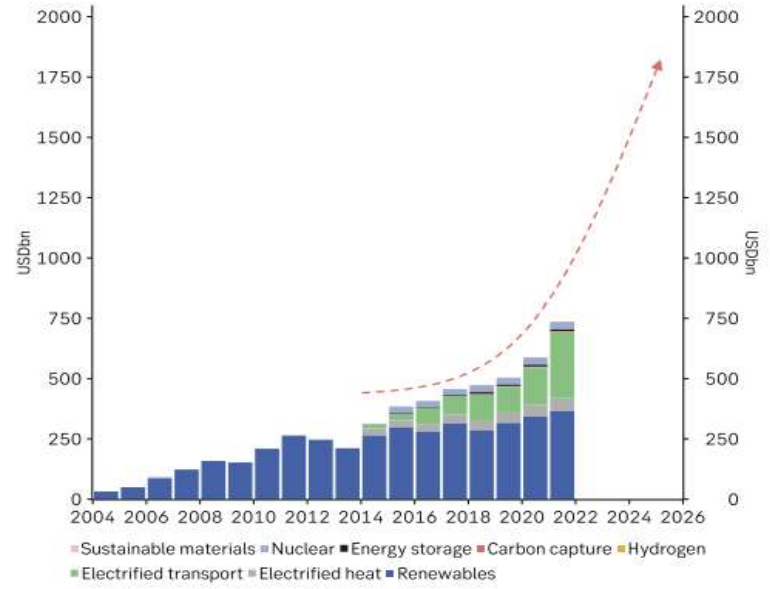
This event made urgent the need for a fast transition within the energy sector to more low-carbon energy. To mitigate this dependency, the European Union needs to increase its energy efficiency through the development of renewable energy that goes in the same direction as the climate crisis concerns. Energy efficiency development can contribute to reducing energy demand.

According to Bloomberg (2022), Europe has been facing a sudden rise in electricity prices. Even though some European Countries like Germany are looking for other sources of opportunities, they are under great pressure as winter is approaching.

Also, I agree with the conclusion by CBI (2022) that EU Countries are developing new technologies intending to emit fewer greenhouse gases in the atmosphere and commit less harm to the environment. In addition, in response to the Russian invasion of Ukraine, the EU has been more encouraged to find alternatives to replace the natural gas dependency on Russia. From now on, the development of green hydrogen has been in the spot line in these countries. To make this transition faster, they can use the EU standard green bond market, which is powered by EU taxonomy able, to identify and check the projects aligned to a zero net carbon commitment to wind down coal usage.

In other to finance sustainable energy, Europe will need to make more use of green bonds.

As per SEB (2022), the Nordic corporate bank SEB reports that the Russia x Ukraine war impulse Europe to invest more in renewable energy due to gas price rise and energy scarcity. In the figure below, we can notice that it is projected a spike in EU new sources of renewable energy until 2026. Nevertheless, a new EU GB will be issued in other to accomplish this energy gap.

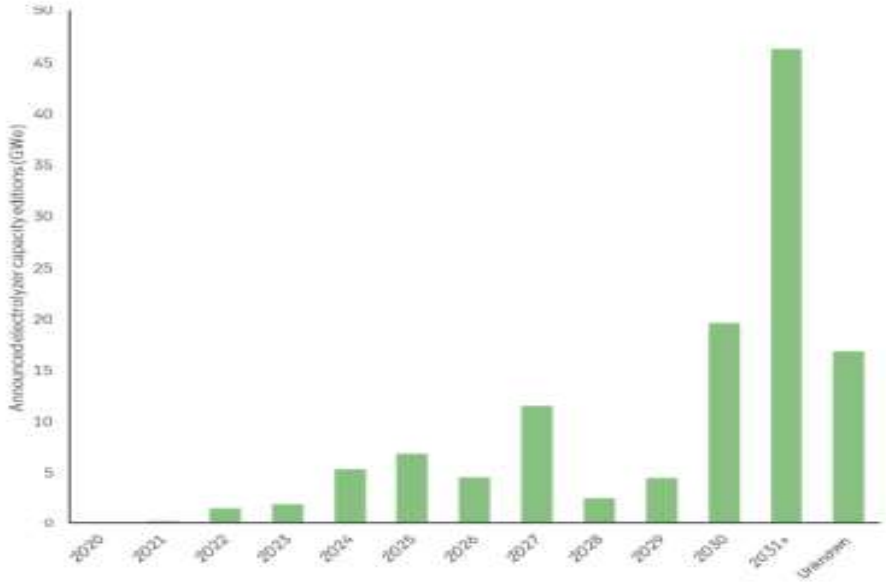


Source: Bloomberg New Energy Finance

Source: SEB; (2022)

In the figure below taken by SEB (2022), we can see that in the long-term fossil-based energy is forecast to be more costly than renewable ones. Accelerating the transition guarantee Europe independency on energy supply as well; it will be positive in terms of cost reduction.

Figure 9 Announced hydrogen investment, GWe



Source: Bloomberg

Figure 5 Levelized cost of energy (LCOE)

Source: Bloomberg New Energy Finance, Bloomberg

Source: SEB; (2022)

It was declared the RepowerEU in May 2022 as a measure of reducing the EU dependence on Russian fossil fuels by gathering forces among European Countries to achieve a feasible energy transition system.

According to the European Commission (2022), the European countries need to reduce their energy consumption and create measures feasible to replace gas, fossil fuels, and coal with more renewable energy; likewise, RePowerEU's ambitious plan. For instance, the EU needs to increase its capacity to produce renewable energy and a more fossil-free hydrogen approach. Furthermore, with the RePowerEU plan's full implementation with a further incentive of renewables such as sustainable biomethane and hydrogen in accordance with the European Commission (2022) analysis, EU gas demand will be expected to decrease and, consequently, its price at a fast rate. In other to implement the ambitious RePowerEU plan, the EU is expected to issue in the EU financial market a considerable level of GB.

According to Reuters (2022), with the REPowerEU, The European Union expects to continue being the leadership and leading voice of the Green bond market. The EU is expecting to reach a

total of EUR 250 billion within 2026 to finance green projects. In addition, the EU is stimulating member states to finance sustainable projects using the COVID-19 recovery fund.

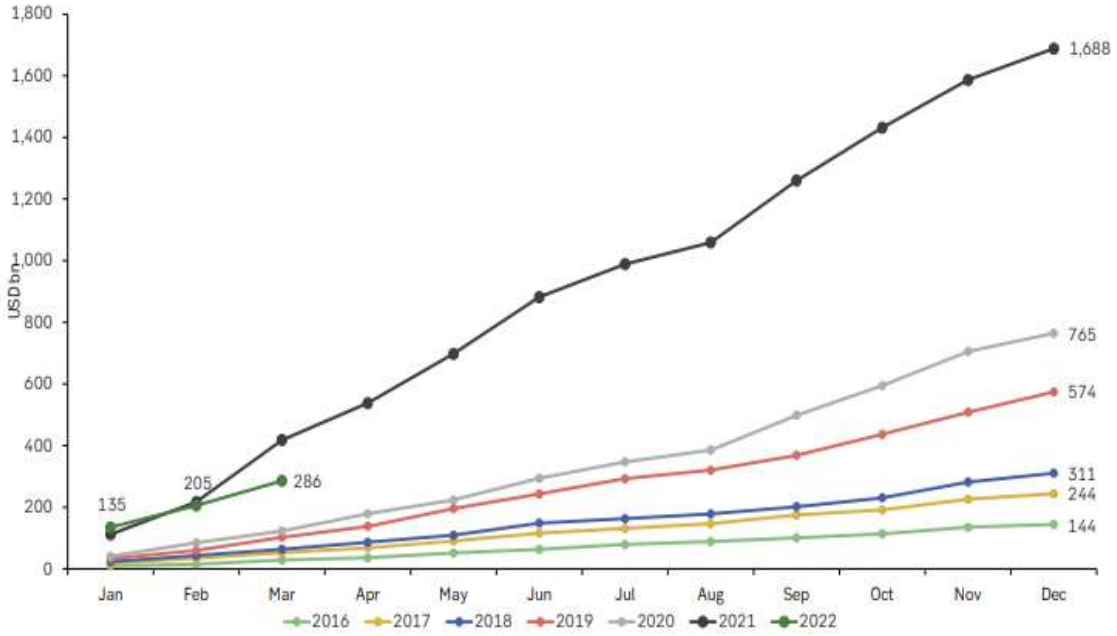
As per Bloomberg (2022), analysis the future contract gas prices in Germany and France reached a plateau. This can impact highly on increasing inflation and depreciating the Euro currency

European energy prices have surged multifold this year
© Bloomberg

Source: Bloomberg; (2022)

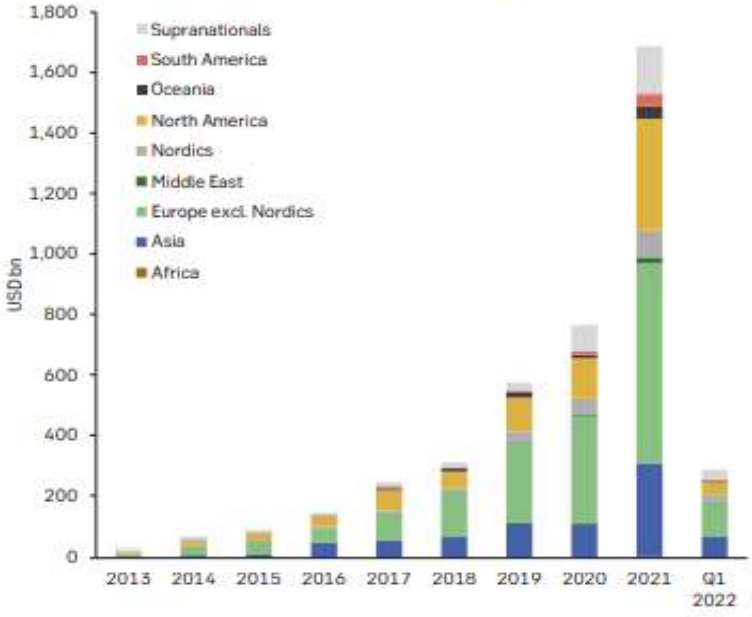
In the figure below taken from SEB (2022), we see that the first quarter of 2022 saw a reduction in GB transactions compared to the same period in 2021.

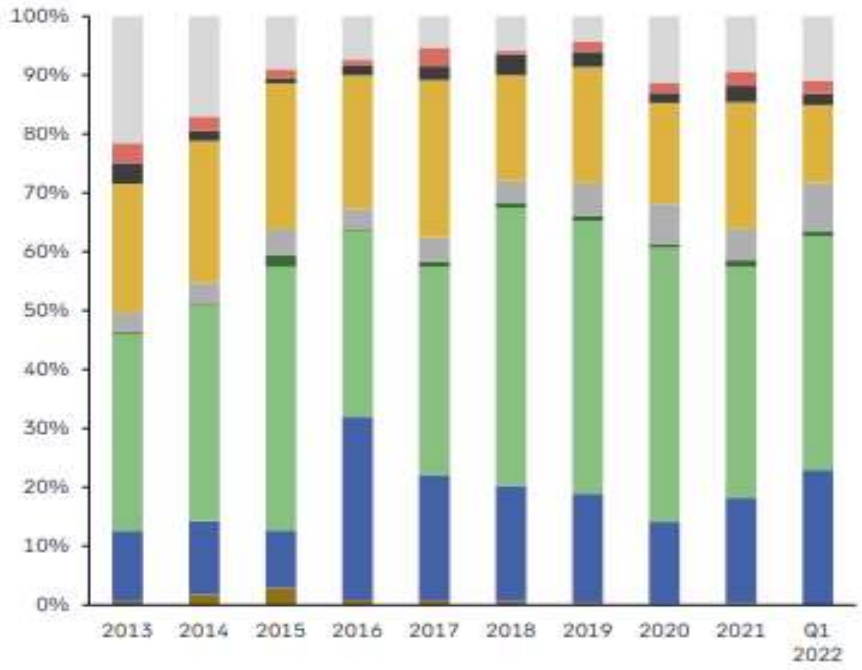
Figure 11 Cumulative sustainable debt transactions



Source: Bloomberg New Energy Finance and Bloomberg 31 March 2022

Figure 26 Sustainable debt market by region



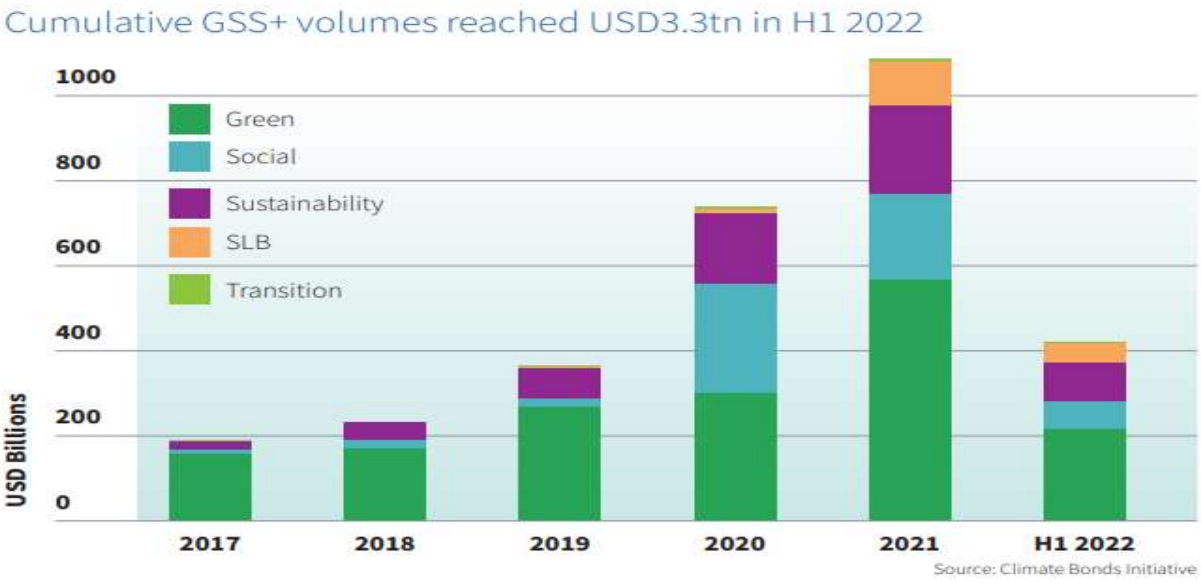


Source: Bloomberg New Energy Finance and Bloomberg 31 March 2022

According to SEB (2022), if we analyze the first quarter of 2022 in Europe, we see that corporate green bonds got a reduction of 20%. This was due to the public sector and energy companies had borrowed less than in 2021, putting their investments in renewable on hold, driven mainly by fossil fuel increase force in price.

However, per SEB (2022), the EU key priority delivered by President Ursula Von Der Leyen's still unchanged. In other to reach the EU green deal commitment, it is necessary that EU countries reach rapid clean energy by 2030, turning Europe independent from Russian gas and making EU climate neutral within 2050.

Despite of the fact of the uncertain financial instability caused by the conflict, the average green bond issuance in Europe has kept on growing. In the figure below, from the climate bond initiatives 2022, we can see that in terms of the first quarter of 2022, the pace of green bond issuance has been increasing.



Source: (Climate bonds initiatives; 2022)

If we compare the years 2021 to 2022, we can reinforce the fact that 2021 performed better in terms of GB issuance than 2022. However, the first half of 2022 did not stop the dynamic of this market.

Source: (Climate Bond Initiative; 2022)

In addition, the European Sovereign Green bonds have been taking a good performance approach within 2022, with Germany, France, and Denmark issuing the largest market share.

As per CBI (2022), *"Germany had raised over EUR30bn (USD36.3bn) since initiating its green bond program in 2020. The German government is planning to issue a new green federal bond in Q3 as part of its strategy to give investors worldwide access to green benchmark bonds and establish a green yield curve. France followed closely with its new 2040 inflation-linked deal (EUR4.0bn/USD4.2bn) and reopening of its 2039 bullet bond (EUR2.8bn/USD3.2bn). Denmark priced its debut green bond in January (DKK5bn/USD20m), a 2031 maturity."* (CBI (2022))

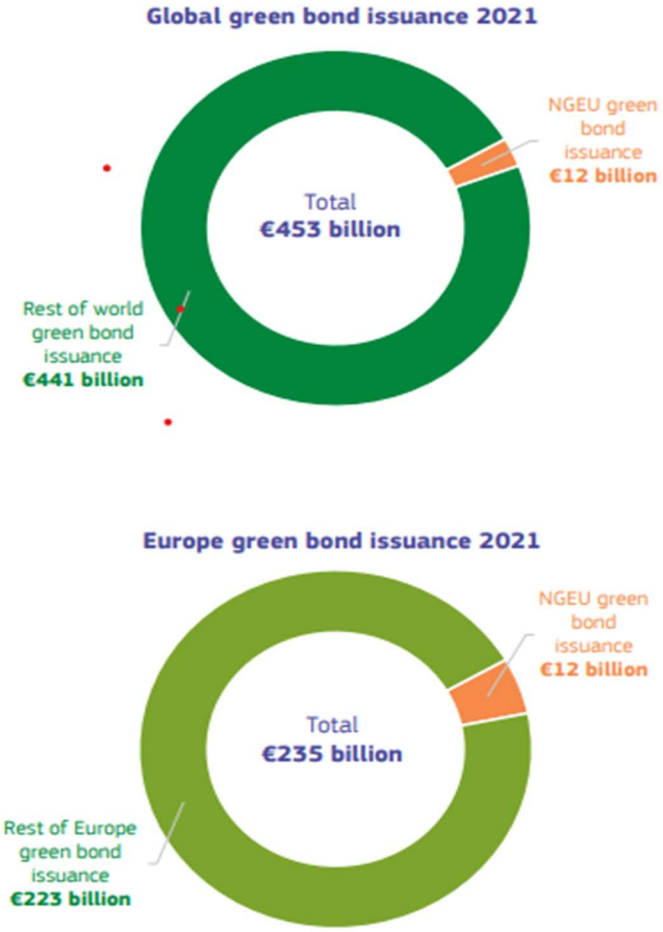
4.8 – Next Generation EU Green Bond market (NGEU)

European Commission's (2022) report on the NextGenerationEU (NGEU) Transformation states that it is a powerful instrument to drive the EU's recovery that has been menacing since the pandemic period. The NGEU consists of borrowing of EUR 806.9 billion between 2021 and 2016 and used as loans and grants to EU Member states and the EU recovery management program. It is known that the NGEU program has been attracting a considerable level of demand from investors.

The European Commission also alleges that NGEU provides a certain spillover for ESG development inside the EU throughout green and social bonds issuance. As described in the previous chapters, these bonds support the social cohesion and green transition in the European States. Furthermore, still based on European Commission analysis, throughout NGEU, the EU is supposed to become the largest GB issuance in the market share. This is because of the European Commision's commitment to raising 30% of the NGEU funds linked to green bonds, which is around EUR 250 billion. These numbers are supposed to increase as climate recovery is gaining each more importance and momentum inside European Union.

During 2022, green transactions have kept their increased demand by investors, which was strongly positive for the European Commission to keep on issuing more sets of green bonds; and consequently, increase the European green transition.

The figure below represents the 2021 year, and we can see the comparison in Euros of GB issuance between Europe and the global level and the total of EU GB issuance in the NGEU environment.



Source: European Commission report on NGEU Bonds (2022).

Conclusion

In summary, I can conclude that climate change is real damage that can negatively impact all financial and economic systems in the near future. As per reported by many authors, There's no planet. Climate change has been proving to be our real menace and is considered a huge catastrophe. Experts on climate change emphasize that there's an urgency to meet the target of greenhouse gas emissions so that we can avoid a catastrophe that will incur vast environmental destruction and prevent Human beings and all species from survival.

The European Union, supported by the European Commission and Parliament, recognizes the importance of the financial sector in playing the role of financial sustainability growth Goal. In addition, the European Central Bank has been taking great participation in orienting the European banks to follow its guidance and advice on financial decisions. I reinforce alongside many authors that Climate change is, in fact, an irreversible threat to the Planet and all living species.

The European Union and the European Central bank are working together with the primary goal of building a climate change adaptation and mitigation plan. Europe intends to arrive in 2050 with the status of a climate-neutral continent. This European goal is quite challenging, but from my point of view, it is taking all the tasks to make this happen. Nevertheless, with the expecting increasing of EU green bonds, a net zero target within Europe will be possible.

As already exposed in the previous chapters of this thesis, green bonds are a new financial instrument in the market. It still represents a small fraction of all the financial instruments disposed of in the financial market. However, as already exposed, since 2014, green bonds have been gaining considerably increased attention among investors, companies, and governments over recent past years.

Green bonds have proven to construct a more approach among responsible investors, driving a solid capital mobilization to sustainable projects and net-zero transition. Increasing a connection between investors' and issuers' expectations to achieve the necessary fund for environmentally friendly projects.

In addition, I would like to highlight that investor are assuming a more climate-friendly profile, seeking to build a responsible investment portfolio. As I have commented in the previous chapter,

investing in green debt instruments helps investors protect themselves against climate change-related risks, especially in the long term. However, we know that a great number of investors still do not consider green bonds attractive due to greenwashing fact that is still present in this market.

Greenwashing is still a problem concerning the green bond market, including the EU green bond market. Nevertheless, as reported in chapter four, the European Union has been proving in recent years to be very engaged with sustainable standards, policies, and Regulations that better certify the greener aspects of the green bonds. The European Parliament, alongside the European Commission, has been working on the performance of a more transparent Taxonomy.

The EU Taxonomy is totally focused on better standardization and harmonization measures. It gives second- and third-part opinion review entities to make a strict screaming on the bonds to better certificate the degree of sustainability and environment that is correlated to them. It has been proven to give more confidence to investors, reducing uncertainty risks. However, we still need more interaction among agencies' credit ratings, better standards of GB assessment guidelines, and more flexibility between ICMA and CBI regarding issuers' and investors' necessities.

Likewise, industries and companies are becoming more committed to sustainable projects in their business plan and adopting a circular economy in their value chain, with a lower impact on Nature. This is becoming more popular as, currently, we can see more enforcement of ESG Regulations and policies imposed by Governments and Regulators, demanding more sustainable aspects and imposing penalties on industries that disrespect environmental policies.

I reinforce and share the view that green bonds were created to stimulate incentives between issuers and investors as it is intended to bring investment responsibility giving confidence, credibility, and more motivation to GB issuers to pursue green ambitions. It is an instrument to tackle the 21st Century's most concerns and Climate change, channeling capital flows to a more sustainable economy.

In addition, as I have presented in the third chapter, green bonds are helpful for companies to lower their capital cost expenditures. Moreover, industries genuinely committed to an environmental policy tend to receive better evaluation and scores by rating Agencies and lower borrowing interest rates alongside banks compared to brown asset industry issuers.

Concerning the EU green bond market, it has been proving will keep on growing. Despite the economic instability and shocks caused by COVID-19, post-recovery, and the Russia x Ukraine war that increased unemployment, more debts, and inflation impairing the European Central bank from following its quantitative easing program, the EU has kept its green bond issuance in the market.

As I have already shown in the fourth chapter, the EU is considered the leader in a global comparison when it comes to green bond markets and the standardization of this market. Accordingly, to JP Morgan Brazil data provided on 29 August 2022, the EU green bonds have evolved considerably from 2018 to 2021 from USD 85,9 Billion to USD 367,8 Billion in issuances. And the numbers are pretty impressive for the current year. From January to July 2022, Europe has issued a total of USD 158.5 Billion despite the energy crises and inflation under the Union Block.

In conclusion, the European Union is trying to be aligned with the Paris Agreement and the United Nations Agenda for 2030. From my viewpoint, With the European Union's new green deal, Europe is expected to implement more measures to improve policies toward environmentally friendly goals. Therefore, it is expected that the EU will maintain leadership among ESG issuers in the long term. Green bonds are and will be seen for a long time as key instruments to guarantee Europe's energy independence in the upcoming years and to mitigate the climate change problem. Europe will remain the leader and the world's example within the green bond market.

Appendix

In the excel table below, extracted from (Euronext Live Markets website) we can see an overview of Green bond issuance inside Europe in terms of issuers, amount, currency, and location from the period comprehended by 2012 to 2022.

Source: ESG Bonds | live (euronext.com)

Issuer	Listing Date	Amount (million)	Currency	Listing Venue
ILE DE FRANCE(REGION D')	3/27/2012	375	EUR	Paris
ILE DE FRANCE(REGION D')	4/24/2014	600	EUR	Paris
ENGIE	5/19/2014	1300	EUR	Paris
AGENCE FSE DE DEVELOPPEMENT	9/17/2014	1000	EUR	Paris
ILE DE FRANCE(REGION D')	4/23/2015	500	EUR	Paris
TENNET HOLDING B.V.	6/4/2015	500	EUR	Amsterdam
KOMMUNALBANKEN AS	6/23/2015	500	USD	Oslo
OSLO KOMMUNE	7/13/2015	1500	NOK	Oslo
SCHNEIDER ELECTRIC SE	10/13/2015	300	EUR	Paris
VILLE DE PARIS	11/18/2015	300	EUR	Paris
BPCE	12/14/2015	300	EUR	Paris
ALLIANDER N.V.	4/22/2016	300	EUR	Amsterdam
COVIVIO	5/20/2016	500	EUR	Paris
TENNET HOLDING B.V.	6/13/2016	500	EUR	Amsterdam
TENNET HOLDING B.V.	6/13/2016	500	EUR	Amsterdam
ILE DE FRANCE(REGION D')	6/14/2016	650	EUR	Paris
ALPERIA S.P.A.	6/30/2016	125	EUR	Dublin
ALPERIA S.P.A.	6/30/2016	100	EUR	Dublin
GREEN STORM 2016 B.V.	6/30/2016	500	EUR	Amsterdam
GREEN STORM 2016 B.V.	6/30/2016	8	EUR	Amsterdam
GREEN STORM 2016 B.V.	6/30/2016	6	EUR	Amsterdam
GREEN STORM 2016 B.V.	6/30/2016	6.8	EUR	Amsterdam
EDF	10/13/2016	1750	EUR	Paris
TENNET HOLDING B.V.	10/24/2016	500	EUR	Amsterdam
ENTRA ASA	10/31/2016	1000	NOK	Oslo
SNCF RESEAU	11/9/2016	900	EUR	Paris
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	11/25/2016	22	EUR	Dublin
COFINIMMO	12/9/2016	55	EUR	Brussels
ALPERIA S.P.A.	12/23/2016	150	EUR	Dublin
FRANCE EMPRUNT D'ETAT	1/6/2017	1632	EUR	Paris

ENEL FINANCE INTERNATIONAL N.V.	1/16/2017	1250	EUR	Dublin
FRANCE EMPRUNT D'ETAT	1/24/2017	7000	EUR	Paris
ILE DE FRANCE(REGION D')	3/14/2017	500	EUR	Paris
ENGIE	3/27/2017	700	EUR	Paris
ENGIE	3/27/2017	800	EUR	Paris
SNCF RESEAU	3/30/2017	1000	EUR	Paris
TENNET HOLDING B.V.	4/12/2017	1100	EUR	Amsterdam
ENTRA ASA	5/23/2017	1000	NOK	Oslo
GREEN STORM 2017 B.V.	5/31/2017	550	EUR	Amsterdam
LYSE AS	6/20/2017	500	NOK	Oslo
THREE GORGES FINANCE II (CAYMAN ISLANDS) LIMITED	6/21/2017	650	EUR	Dublin
TENNET HOLDING B.V.	6/26/2017	500	EUR	Amsterdam
TENNET HOLDING B.V.	6/26/2017	500	EUR	Amsterdam
RATP	6/29/2017	500	EUR	Paris
FRANCE EMPRUNT D'ETAT	7/12/2017	1065	EUR	Paris
SNCF RESEAU	7/20/2017	1100	EUR	Paris
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	9/20/2017	65	EUR	Dublin
ENGIE	9/28/2017	500	EUR	Paris
ENGIE	9/28/2017	750	EUR	Paris
ALPERIA S.P.A.	10/18/2017	935	NOK	Dublin
IREN S.P.A.	10/24/2017	500	EUR	Dublin
EIDSIVA ENERGI AS	11/3/2017	750	NOK	Oslo
AGENCE FSE DE DEVELOPPEMENT	11/15/2017	750	EUR	Paris
AGDER ENERGI AS	11/17/2017	750	NOK	Oslo
BANK OF CHINA LTD PARIS BRANCH	11/22/2017	500	USD	Paris
FERROVIE DELLO STATO ITALIANE S.P.A.	12/7/2017	600	EUR	Dublin
KOMMUNALBANKEN AS	12/7/2017	750	NOK	Oslo
KOMMUNALBANKEN AS	12/7/2017	600	NOK	Oslo
AKUO ENERGY	12/8/2017	50	EUR	Paris
AKUO ENERGY	12/8/2017	10	EUR	Paris
ENEL FINANCE INTERNATIONAL N.V.	1/16/2018	1250	EUR	Dublin
ENGIE	1/16/2018	1000	EUR	Paris
VASAKRONAN AB (PUBL)	2/1/2018	400	NOK	Oslo
SPAREBANK 1 BOLIGKREDITT	2/2/2018	1000	EUR	Oslo
L ETAT BELGE - BELGISCHE STAAT	3/5/2018	4500	EUR	Brussels
SWEDBANK AB (PUBL)	3/29/2018	500	SEK	Dublin
SWEDBANK AB (PUBL)	3/29/2018	1500	SEK	Dublin
ABN AMRO BANK N.V.	4/18/2018	750	EUR	Amsterdam
FRANCE EMPRUNT D'ETAT	5/4/2018	1096	EUR	Paris
VASAKRONAN AB (PUBL)	5/18/2018	150	NOK	Oslo
GREEN STORM 2018 B.V.	5/30/2018	550	EUR	Amsterdam

TENNET HOLDING B.V.	6/5/2018	500	EUR	Amsterdam
TENNET HOLDING B.V.	6/5/2018	750	EUR	Amsterdam
DNB BOLIGKREDITT AS	6/19/2018	1500	EUR	Dublin
ILE DE FRANCE(REGION D')	6/20/2018	500	EUR	Paris
FRANCE EMPRUNT D'ETAT	6/25/2018	4000	EUR	Paris
KBC GROEP	6/27/2018	500	EUR	Brussels
SVENSKA HANDELSBANKEN AB (PUBL)	7/3/2018	500	EUR	Dublin
SOGN OG FJORDANE ENERGI AS	8/10/2018	300	NOK	Oslo
SOGN OG FJORDANE ENERGI AS	8/10/2018	200	NOK	Oslo
AB STENA METALL FINANS	9/3/2018	800	SEK	Oslo
AGENCE FSE DE DEVELOPPEMENT	9/17/2018	500	EUR	Paris
IREN S.P.A.	9/19/2018	500	EUR	Dublin
IRISH GOVERNMENT BONDS	10/10/2018	5000	EUR	Dublin
EDP FINANCE B.V.	10/12/2018	600	EUR	Dublin
ROYAL SCHIPHOL GROUP N.V.	11/5/2018	500	EUR	Amsterdam
ING GROEP N.V.	11/15/2018	1500	EUR	Amsterdam
POSTE(LA)	11/30/2018	500	EUR	Paris
CREDIT AGRICOLE S.A. LONDON BR	12/5/2018	1000	EUR	Paris
FINGRID OYJ	1/9/2019	100	EUR	Dublin
DIGITAL EURO FINCO, LLC	1/16/2019	1075	EUR	Dublin
ENEL FINANCE INTERNATIONAL N.V.	1/21/2019	1000	EUR	Dublin
SNCF RESEAU	1/22/2019	850	EUR	Paris
ENGIE	1/28/2019	1000	EUR	Paris
EDP – ENERGIAS DE PORTUGAL, S.A.	1/30/2019	1000	EUR	Dublin
DNB BOLIGKREDITT AS	1/31/2019	9700	SEK	Dublin
VASAKRONAN AB (PUBL)	2/1/2019	500	SEK	Dublin
FRANCE EMPRUNT D'ETAT	2/5/2019	2471	EUR	Paris
TELEFONICA EMISIONES S.A.U	2/5/2019	1000	EUR	Dublin
VASAKRONAN AB (PUBL)	2/13/2019	50	EUR	Dublin
VASAKRONAN AB (PUBL)	2/25/2019	500	SEK	Dublin
OP CORPORATE BANK PLC	2/26/2019	500	EUR	Dublin
VASAKRONAN AB (PUBL)	2/26/2019	500	SEK	Dublin
SOCIEDADE BIOELETRICA MONDEGO	2/27/2019	50	EUR	Lisbon
VASAKRONAN AB (PUBL)	3/5/2019	63.6	EUR	Dublin
LEASEPLAN CORPORATION N.V.	3/7/2019	500	EUR	Amsterdam
VASAKRONAN AB (PUBL)	3/13/2019	100	SEK	Dublin
DANSKE BANK A/S	3/15/2019	500	EUR	Dublin
VASAKRONAN AB (PUBL)	3/22/2019	10000	JPY	Dublin
UNIONE DI BANCHE ITALIANE S.P.A.	4/10/2019	500	EUR	Dublin
BANCO BILBAO VIZCAYA ARGENTARIA, S.A.	4/11/2019	1000	EUR	Dublin
VASAKRONAN AB (PUBL)	4/12/2019	200	SEK	Dublin
ABN AMRO BANK N.V.	4/15/2019	750	EUR	Amsterdam

BANQUE POSTALE (LA)	4/24/2019	750	EUR	Paris
VASAKRONAN AB (PUBL)	4/24/2019	100	SEK	Dublin
FRANCE EMPRUNT D'ETAT	5/9/2019	1676	EUR	Paris
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/22/2019	0.0000000 1	EUR	Amsterda m
NEDERLAND	5/23/2019	5985.004	EUR	Amsterda m
VESTEDA FINANCE BV	5/24/2019	500	EUR	Amsterda m
VASAKRONAN AB (PUBL)	5/31/2019	100	NOK	Oslo
FRANCE EMPRUNT D'ETAT	6/2/2019	1982	EUR	Paris
TENNET HOLDING B.V.	6/3/2019	500	EUR	Amsterda m
TENNET HOLDING B.V.	6/3/2019	750	EUR	Amsterda m
VASAKRONAN AB (PUBL)	6/3/2019	10	EUR	Dublin
ESB FINANCE DESIGNATED ACTIVITY COMPANY	6/11/2019	500	EUR	Dublin
CAISSE DEPOTS ET CONSIGNATIONS	6/19/2019	500	EUR	Paris
RATP	6/20/2019	500	EUR	Paris
VASAKRONAN AB (PUBL)	6/20/2019	283	SEK	Dublin
BANCO BILBAO VIZCAYA ARGENTARIA, S.A.	6/21/2019	1000	EUR	Dublin
ENGIE	6/21/2019	750	EUR	Paris
ENGIE	6/21/2019	750	EUR	Paris
NORGESGRUPPEN ASA	6/21/2019	400	NOK	Oslo
ALLIANDER N.V.	6/24/2019	300	EUR	Amsterda m

SMAKRAFT AS	6/26/2019	50	EUR	Oslo
VASAKRONAN AB (PUBL)	6/26/2019	30	AUD	Dublin
FRANCE EMPRUNT D'ETAT	7/2/2019	1737	EUR	Paris
SNCF RESEAU	7/4/2019	1500	EUR	Paris
HERA S.P.A.	7/5/2019	500	EUR	Dublin
FERROVIE DELLO STATO ITALIANE S.P.A.	7/9/2019	700	EUR	Dublin
VASAKRONAN AB (PUBL)	7/9/2019	75	USD	Dublin
GREEN STORM 2019 B.V.	7/18/2019	600	EUR	Amsterdam
SOCIETE GENERALE SFH	7/18/2019	1000	EUR	Paris
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	8/6/2019	17	EUR	Dublin
SNCF RESEAU	8/14/2019	100	EUR	Paris
EEW CAPITAL FINANCE PLC	8/16/2019	25	EUR	Dublin
VASAKRONAN AB (PUBL)	8/29/2019	1200	SEK	Dublin
VASAKRONAN AB (PUBL)	8/30/2019	200	SEK	Dublin
VASAKRONAN AB (PUBL)	9/2/2019	700	SEK	Dublin
ENTRA ASA	9/5/2019	900	NOK	Oslo
ENTRA ASA	9/5/2019	700	NOK	Oslo
VASAKRONAN AB (PUBL)	9/5/2019	100	SEK	Dublin
SAMHÄLLSBYGGNADSBOLAGET I NORDEN AB (PUBL)	9/6/2019	500	SEK	Dublin
VASAKRONAN AB (PUBL)	9/9/2019	25	AUD	Dublin
VASAKRONAN AB (PUBL)	9/11/2019	1000	SEK	Dublin
LEASEPLAN CORPORATION N.V.	9/13/2019	1000	EUR	Amsterdam
EDP FINANCE B.V.	9/16/2019	600	EUR	Dublin
COVIVIO	9/17/2019	500	EUR	Paris
SPAREBANKEN SOGN OG FJORDANE	9/19/2019	300	NOK	Oslo
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	9/25/2019	35.5	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	10/4/2019	49.4	EUR	Dublin
BANCO SANTANDER, S.A.	10/4/2019	1000	EUR	Dublin
VASAKRONAN AB (PUBL)	10/9/2019	100	SEK	Dublin
IREN S.P.A.	10/14/2019	500	EUR	Dublin
VASAKRONAN AB (PUBL)	10/16/2019	200	SEK	Dublin
ENEL FINANCE INTERNATIONAL N.V.	10/17/2019	500	EUR	Dublin
ENEL FINANCE INTERNATIONAL N.V.	10/17/2019	1000	EUR	Dublin
ENEL FINANCE INTERNATIONAL N.V.	10/17/2019	1000	EUR	Dublin
CREDIT AGRICOLE S.A. LONDON BR	10/21/2019	1000	EUR	Paris
ENGIE	10/24/2019	900	EUR	Paris
SPAREBANKEN SØR BOLIGKREDITT AS	10/24/2019	500	EUR	Dublin
VASAKRONAN AB (PUBL)	10/24/2019	30	EUR	Dublin
CPI PROPERTY GROUP	10/28/2019	750	EUR	Dublin
ACTION LOGEMENT SERVICES SAS	10/30/2019	1000	EUR	Paris
FERDE AS	11/14/2019	800	NOK	Oslo
FERDE AS	11/14/2019	800	NOK	Oslo
VASAKRONAN AB (PUBL)	11/18/2019	13	EUR	Dublin
VASAKRONAN AB (PUBL)	11/19/2019	200	SEK	Dublin

VASAKRONAN AB (PUBL)	11/20/2019	25	AUD	Dublin
AKUO ENERGY	11/22/2019	45	EUR	Paris
CITYCON OYJ	11/22/2019	350	EUR	Dublin
CNP ASSURANCES	11/27/2019	750	EUR	Paris
BPCE	12/4/2019	500	EUR	Paris
IDB TRUST SERVICES LIMITED	12/4/2019	1000	EUR	Dublin
ALTERA SHUTTLE TANKERS LLC	12/6/2019	125	USD	Oslo
CNP ASSURANCES	12/10/2019	250	EUR	Paris
EIDSIVA ENERGI AS	12/19/2019	500	NOK	Oslo
EIDSIVA ENERGI AS	12/19/2019	1000	NOK	Oslo
FANA SPAREBANK BOLIGKREDITT AS	12/19/2019	300	NOK	Oslo
SOGN OG FJORDANE ENERGI AS	12/19/2019	200	NOK	Oslo
SOGN OG FJORDANE ENERGI AS	12/19/2019	200	NOK	Oslo
ALERION CLEAN POWER S.P.A	12/19/2019	200	EUR	Dublin
NEXITY	12/20/2019	84	EUR	Paris
NEXITY	12/20/2019	156	EUR	Paris
ROYAL BANK OF CANADA	12/31/2019	3.927	GBP	Dublin
ROYAL BANK OF CANADA	12/31/2019	3.982	USD	Dublin
ROYAL BANK OF CANADA	12/31/2019	4.125	GBP	Dublin
ROYAL BANK OF CANADA	12/31/2019	5.3	USD	Dublin
BUSTAKREDITT SOGN OG FJORDANE	1/2/2020	500	NOK	Oslo
DIGITAL DUTCH FINCO B.V.	1/17/2020	650	EUR	Dublin
DIGITAL DUTCH FINCO B.V.	1/17/2020	750	EUR	Dublin
EDP – ENERGIAS DE PORTUGAL, S.A.	1/20/2020	750	EUR	Dublin
VASAKRONAN AB (PUBL)	1/20/2020	250	SEK	Dublin
CPI PROPERTY GROUP	1/22/2020	350	GBP	Dublin
FERDE AS	1/27/2020	900	NOK	Oslo
FERDE AS	1/27/2020	1100	NOK	Oslo
VASAKRONAN AB (PUBL)	1/27/2020	200	SEK	Dublin
VASAKRONAN AB (PUBL)	1/28/2020	200	SEK	Dublin
FERDE AS	1/29/2020	300	NOK	Oslo
SAMHÄLLSBYGGNADSBOLAGET I NORDEN AB (PUBL)	1/30/2020	350	SEK	Dublin
VASAKRONAN AB (PUBL)	1/30/2020	250	NOK	Oslo
RIKSHEM AB (PUBL)	2/3/2020	300	SEK	Dublin
RIKSHEM AB (PUBL)	2/3/2020	600	SEK	Dublin
FRANCE EMPRUNT D'ETAT	2/4/2020	2607	EUR	Paris
TELEFÓNICA EUROPE B.V	2/5/2020	500	EUR	Dublin
RIVER GREEN FINANCE 2020 DAC	2/6/2020	103.5	EUR	Dublin
RIVER GREEN FINANCE 2020 DAC	2/6/2020	25.2	EUR	Dublin
RIVER GREEN FINANCE 2020 DAC	2/6/2020	23.6	EUR	Dublin
RIVER GREEN FINANCE 2020 DAC	2/6/2020	34.09	EUR	Dublin
VASAKRONAN AB (PUBL)	2/6/2020	10	EUR	Dublin
VASAKRONAN AB (PUBL)	2/6/2020	250	SEK	Dublin

VASAKRONAN AB (PUBL)	2/10/2020	300	NOK	Oslo
HEMSÖ FASTIGHETS AB	2/11/2020	500	SEK	Dublin
SOCIETE GENERALE SFH	2/11/2020	1000	EUR	Paris
SANTANDER CONSUMER BANK AS	2/12/2020	1000	SEK	Dublin
AGENCE FSE DE DEVELOPPEMENT	2/17/2020	1000	EUR	Paris
VASAKRONAN AB (PUBL)	2/17/2020	200	NOK	Oslo
SAMHÄLLSBYGGNADSBOLAGET I NORDEN AB (PUBL)	2/17/2020	150	SEK	Dublin
HEMSÖ FASTIGHETS AB	2/18/2020	55	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	2/18/2020	50	EUR	Dublin
VASAKRONAN AB (PUBL)	2/19/2020	250	SEK	Dublin
VASAKRONAN AB (PUBL)	2/28/2020	700	NOK	Oslo
NORGESGRUPPEN ASA	3/2/2020	500	NOK	Oslo
VASAKRONAN AB (PUBL)	3/13/2020	1400	JPY	Dublin
ENGIE	3/27/2020	750	EUR	Paris
ENGIE	3/27/2020	750	EUR	Paris
SNCF SA	3/27/2020	50	EUR	Paris
VASAKRONAN AB (PUBL)	4/2/2020	1350	SEK	Dublin
VASAKRONAN AB (PUBL)	4/2/2020	500	NOK	Dublin
ROYAL SCHIPHOL GROUP N.V.	4/6/2020	750	EUR	Amsterdam
REGION WALLONNE	4/8/2020	500	EUR	Brussels
LEASEPLAN CORPORATION N.V.	4/9/2020	500	EUR	Amsterdam
EDP – ENERGIAS DE PORTUGAL, S.A.	4/15/2020	750	EUR	Dublin
SNCF SA	4/17/2020	1250	EUR	Paris
RMBS GREEN BELÉM NO.1	4/30/2020	331.3	EUR	Lisbon
CPI PROPERTY GROUP	5/12/2020	750	EUR	Dublin
HEMSÖ FASTIGHETS AB	5/13/2020	850	SEK	Dublin
SBAB BANK AB (PUBL)	5/13/2020	500	EUR	Dublin
SWISSCOM FINANCE B.V.	5/14/2020	500	EUR	Dublin
SNCF SA	5/18/2020	25	EUR	Paris
NORGESGRUPPEN ASA	5/22/2020	650	NOK	Oslo
UNEDIC (UNI.INTERPRO.EMPLOI)	5/25/2020	4000	EUR	Paris
BPCE SFH	5/27/2020	1250	EUR	Paris
VASAKRONAN AB (PUBL)	5/27/2020	10	EUR	Dublin
VASAKRONAN AB (PUBL)	5/29/2020	200	SEK	Dublin
VASAKRONAN AB (PUBL)	6/2/2020	200	SEK	Dublin
VASAKRONAN AB (PUBL)	6/2/2020	300	SEK	Dublin
SPAREBANK 1 BOLIGKREDITT	6/3/2020	7500	SEK	Oslo
VASAKRONAN AB (PUBL)	6/3/2020	300	SEK	Dublin
VASAKRONAN AB (PUBL)	6/3/2020	300	SEK	Dublin
BANCO BILBAO VIZCAYA ARGENTARIA, S.A.	6/4/2020	1000	EUR	Dublin
PEARSON FUNDING PLC	6/4/2020	350	GBP	Dublin
REGION WALLONNE	6/5/2020	1000	EUR	Brussels
AQUAFIN	6/10/2020	125	EUR	Brussels

ALLIANDER N.V.	6/10/2020	500	EUR	Amsterdam
VASAKRONAN AB (PUBL)	6/10/2020	176	NOK	Oslo
ENEXIS HOLDING NV	6/17/2020	500	EUR	Amsterdam
UNEDIC (UNI.INTERPRO.EMPLOI)	6/17/2020	4000	EUR	Paris
IDB TRUST SERVICES LIMITED	6/25/2020	1500	USD	Dublin
SSB BOLIGKREDITT AS	6/25/2020	300	NOK	Oslo
MOWI ASA	6/26/2020	200	EUR	Oslo
ILE DE FRANCE(REGION D')	6/30/2020	550	EUR	Paris
ILE DE FRANCE(REGION D')	6/30/2020	250	EUR	Paris
FRANCE EMPRUNT D'ETAT	7/2/2020	2109	EUR	Paris
SAMHÄLLSBYGGNADSBOLAGET I NORDEN AB (PUBL)	7/9/2020	100	SEK	Dublin
SAMHÄLLSBYGGNADSBOLAGET I NORDEN AB (PUBL)	7/9/2020	100	SEK	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	7/13/2020	30	USD	Dublin
UNEDIC (UNI.INTERPRO.EMPLOI)	7/16/2020	2000	EUR	Paris
TENNET HOLDING B.V.	7/22/2020	1000	EUR	Amsterdam
ESB FINANCE DESIGNATED ACTIVITY COMPANY	7/23/2020	200	EUR	Dublin
GLOBALWORTH REAL ESTATE INVESTMENTS LIMITED	7/29/2020	400	EUR	Dublin
GEORGIA GLOBAL UTILITIES JSC	7/30/2020	250	USD	Dublin
EAST RENEWABLE AB	8/5/2020	75	EUR	Oslo
ENTRA ASA	8/14/2020	1500	NOK	Oslo
VASAKRONAN AB (PUBL)	8/14/2020	200	SEK	Dublin
VASAKRONAN AB (PUBL)	8/21/2020	1040	SEK	Dublin
VASAKRONAN AB (PUBL)	8/21/2020	300	SEK	Dublin
VASAKRONAN AB (PUBL)	8/26/2020	90	AUD	Dublin
SAMHÄLLSBYGGNADSBOLAGET I NORDEN AB (PUBL)	9/1/2020	200	SEK	Dublin
SAMHÄLLSBYGGNADSBOLAGET I NORDEN AB (PUBL)	9/1/2020	200	SEK	Dublin
SAMHÄLLSBYGGNADSBOLAGET I NORDEN AB (PUBL)	9/2/2020	200	SEK	Dublin
ROYAL SCHIPHOL GROUP N.V.	9/8/2020	500	EUR	Amsterdam
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	9/9/2020	3	EUR	Dublin
BANCO DE SABADELL SA	9/11/2020	500	EUR	Dublin
VASAKRONAN AB (PUBL)	9/11/2020	200	SEK	Dublin
EDF	9/14/2020	2400	EUR	Paris
ASSURA FINANCING PLC	9/15/2020	300	GBP	Dublin
CAISSE DEPOTS ET CONSIGNATIONS	9/15/2020	500	EUR	Paris
CAISSE AMORT.DETTE SOCIALE	9/16/2020	5000	EUR	Paris
VASAKRONAN AB (PUBL)	9/16/2020	100	SEK	Dublin
SAMHÄLLSBYGGNADSBOLAGET I NORDEN AB (PUBL)	9/18/2020	100	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	9/22/2020	10.4	EUR	Dublin
SOCIETE GENERALE	9/22/2020	1000	EUR	Paris
CAISSE AMORT.DETTE SOCIALE	9/23/2020	4000	USD	Paris
DIGITAL DUTCH FINCO B.V.	9/23/2020	750	EUR	Dublin

SATO CORPORATION	9/24/2020	350	EUR	Dublin
AIB GROUP PLC	9/30/2020	1000	EUR	Dublin
CTP N.V.	10/1/2020	331.813	EUR	Dublin
CAISSE AMORT.DETTE SOCIALE	10/6/2020	5000	EUR	Paris
BUSTAKREDITT SOGN OG FJORDANE	10/13/2020	600	NOK	Oslo
SPAREBANK 1 HALLINGDAL VALDRES	10/13/2020	125	NOK	Oslo
AGDER ENERGI AS	10/15/2020	600	NOK	Oslo
BANCO DE SABADELL SA	10/15/2020	120	EUR	Dublin
UNEDIC (UNI.INTERPRO.EMPLOI)	10/15/2020	3000	EUR	Paris
VASAKRONAN AB (PUBL)	10/16/2020	75	USD	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	10/20/2020	24.6	EUR	Dublin
ENEL FINANCE INTERNATIONAL N.V.	10/20/2020	500	GBP	Dublin
VILLE DE PARIS	10/20/2020	300	EUR	Paris
CAISSE AMORT.DETTE SOCIALE	10/21/2020	3000	USD	Paris
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	10/23/2020	39.5	EUR	Dublin
EIDSIVA ENERGI AS	10/26/2020	900	NOK	Oslo
EIDSIVA ENERGI AS	10/26/2020	1000	NOK	Oslo
GRIEG SEAFOOD ASA	10/27/2020	1500	NOK	Oslo
VASAKRONAN AB (PUBL)	10/27/2020	100	NOK	Oslo
AGENCE FSE DE DEVELOPPEMENT	10/28/2020	2000	EUR	Paris
GETLINK SE	10/30/2020	700	EUR	Dublin
VASAKRONAN AB (PUBL)	11/2/2020	150	NOK	Oslo
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	11/3/2020	12	EUR	Dublin
ENTRA ASA	11/3/2020	1000	NOK	Oslo
BONHEUR ASA	11/4/2020	700	NOK	Oslo
UNEDIC (UNI.INTERPRO.EMPLOI)	11/4/2020	1500	EUR	Paris
VASAKRONAN AB (PUBL)	11/16/2020	50	USD	Dublin
SPAREBANK 1 SMN	11/19/2020	2000	NOK	Oslo
SPAREBANK 1 SMN	11/19/2020	1250	NOK	Oslo
UNEDIC (UNI.INTERPRO.EMPLOI)	11/19/2020	2500	EUR	Paris
UPM KYMMENE CORPORATION	11/19/2020	750	EUR	Dublin
ISLANDSBANKI HF.	11/20/2020	300	EUR	Dublin
SCHNEIDER ELECTRIC SE	11/24/2020	650	EUR	Paris
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	11/24/2020	10.2	EUR	Dublin
CITYCON TREASURY B.V.	11/25/2020	800	NOK	Oslo
HEIMSTADEN BOSTAD AB (PUBL)	11/25/2020	400	SEK	Dublin
HEIMSTADEN BOSTAD AB (PUBL)	11/25/2020	800	SEK	Dublin
HEMSÖ FASTIGHETS AB	11/25/2020	300	SEK	Dublin
HEMSÖ FASTIGHETS AB	11/25/2020	600	SEK	Dublin
CTP N.V.	11/27/2020	400	EUR	Dublin
ENGIE	11/30/2020	850	EUR	Paris
TENNET HOLDING B.V.	11/30/2020	600	EUR	Amsterdam
TENNET HOLDING B.V.	11/30/2020	750	EUR	Amsterdam

SNCF SA	12/1/2020	200	EUR	Paris
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	12/2/2020	120	EUR	Dublin
AEROPORTI DI ROMA SPA	12/2/2020	300	EUR	Dublin
CAISSE AMORT.DETTE SOCIALE	12/2/2020	3000	EUR	Paris
FLUVIUS SYSTEM OPERATOR	12/2/2020	600	EUR	Brussels
RIKSHEM AB (PUBL)	12/2/2020	300	NOK	Dublin
SVENSKA HANDELSBANKEN AB (PUBL)	12/2/2020	500	EUR	Dublin
TURKIYE VAKIFLAR BANKASI T.A.O	12/8/2020	750	USD	Dublin
VASAKRONAN AB (PUBL)	12/8/2020	730	SEK	Dublin
CREDIT AGRICOLE S.A.	12/9/2020	1000	EUR	Paris
VASAKRONAN AB (PUBL)	12/10/2020	100	SEK	Dublin
SBB TREASURY OYJ	12/14/2020	700	EUR	Dublin
AKUO ENERGY	12/15/2020	60	EUR	Paris
VASAKRONAN AB (PUBL)	12/15/2020	100	SEK	Dublin
IREN S.P.A.	12/17/2020	300	EUR	Dublin
LYSE AS	12/17/2020	750	NOK	Oslo
LYSE AS	12/17/2020	500	NOK	Oslo
SAMHÄLLSBYGGNADSBOLAGET I NORDEN AB (PUBL)	12/18/2020	200	SEK	Dublin
GLITRE ENERGI A.S.	1/11/2021	300	NOK	Oslo
DIGITAL INTREPID HOLDING B.V.	1/12/2021	1000	EUR	Dublin
VZ VENDOR FINANCING II B.V.	1/15/2021	700	EUR	Dublin
VASAKRONAN AB (PUBL)	1/18/2021	600	NOK	Oslo
RIKSHEM AB (PUBL)	1/19/2021	300	SEK	Dublin
SANTANDER CONSUMER BANK AS	1/19/2021	500	SEK	Dublin
CAISSE AMORT.DETTE SOCIALE	1/20/2021	5000	USD	Paris
COVIVIO	1/20/2021	100	EUR	Paris
DNB BOLIGKREDITT AS	1/21/2021	1500	EUR	Dublin
SAMHÄLLSBYGGNADSBOLAGET I NORDEN AB (PUBL)	1/26/2021	1000	SEK	Dublin
CAISSE AMORT.DETTE SOCIALE	1/27/2021	1500	GBP	Paris
CBRE GLOBAL INVESTORS OPEN-ENDED FUNDS S.C.A. SICAV-SIF	1/27/2021	500	EUR	Dublin
SNCF SA	1/27/2021	100	EUR	Paris
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	1/29/2021	17	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	2/1/2021	17.5	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	2/3/2021	61	EUR	Dublin
CAISSE AMORT.DETTE SOCIALE	2/3/2021	4000	EUR	Paris
VASAKRONAN AB (PUBL)	2/3/2021	150	SEK	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	2/4/2021	50	EUR	Dublin
FRANCE EMPRUNT D'ETAT	2/4/2021	1499	EUR	Paris
SPAREBANKEN SOGN OG FJORDANE	2/5/2021	200	NOK	Oslo
VASAKRONAN AB (PUBL)	2/11/2021	300	SEK	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	2/11/2021	35	EUR	Dublin
VASAKRONAN AB (PUBL)	2/11/2021	300	SEK	Dublin
TELEFÓNICA EUROPE B.V	2/12/2021	1000	EUR	Dublin

ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	2/15/2021	19	EUR	Dublin
UNEDIC (UNI.INTERPRO.EMPLOI)	2/16/2021	3000	EUR	Paris
RIKSHEM AB (PUBL)	2/17/2021	400	SEK	Dublin
VASAKRONAN AB (PUBL)	2/17/2021	50	USD	Dublin
CAISSE AMORT.DETTE SOCIALE	2/18/2021	5000	USD	Paris
CTP B.V.	2/18/2021	500	EUR	Dublin
Akershus Energi AS	2/22/2021	500	NOK	Oslo
Akershus Energi AS	2/22/2021	500	NOK	Oslo
LEASEPLAN CORPORATION N.V.	2/23/2021	1000	EUR	Amsterdam
GLITRE ENERGI A.S.	2/25/2021	300	NOK	Oslo
ROYAL BANK OF CANADA	2/25/2021	10	USD	Dublin
ROYAL BANK OF CANADA	2/26/2021	10	EUR	Dublin
IJsbeer Energie Europa B.V	3/4/2021	35	EUR	Oslo
VASAKRONAN AB (PUBL)	3/5/2021	15	USD	Dublin
KREDITTFORENINGEN FOR SPAREBANKER	3/11/2021	436	NOK	Oslo
CITYCON TREASURY B.V.	3/12/2021	350	EUR	Dublin
GIMV N.V.	3/15/2021	100	EUR	Brussels
CAISSE AMORT.DETTE SOCIALE	3/17/2021	5000	EUR	Paris
VASAKRONAN AB (PUBL)	3/19/2021	400	HKD	Dublin
ATENOR	3/19/2021	75	EUR	Brussels
ATENOR	3/19/2021	25	EUR	Brussels
FAURECIA S.E.	3/22/2021	400	EUR	Dublin
UPM KYMMENE CORPORATION	3/22/2021	500	EUR	Dublin
PUBLIC POWER CORPORATION S.A.	3/23/2021	650	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	3/23/2021	50	EUR	Dublin
FERROVIE DELLO STATO ITALIANE S.P.A.	3/25/2021	1000	EUR	Dublin
OP MORTGAGE BANK	3/25/2021	750	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	3/25/2021	10	EUR	Dublin
VASAKRONAN AB (PUBL)	3/30/2021	250	SEK	Dublin
ISDB TRUST SERVICES NO.2 SARL	3/31/2021	2500	USD	Dublin
STOREBRAND LIVSFORSIKRING AS	3/31/2021	300	EUR	Dublin
WERELDHAVE BELGIUM	3/31/2021	32	EUR	Brussels
ORPEA	4/1/2021	500	EUR	Paris
UNEDIC (UNI.INTERPRO.EMPLOI)	4/1/2021	3000	EUR	Paris
VÍA CÉLERE DESARROLLOS INMOBILIARIOS, S.A.	4/1/2021	300	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	4/7/2021	62	RON	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	4/7/2021	25	PLN	Dublin
PUBLIC POWER CORPORATION S.A.	4/8/2021	125	EUR	Dublin
ODFJELL SE	4/13/2021	850	NOK	Oslo
ENEXIS HOLDING NV	4/14/2021	500	EUR	Amsterdam
HAFSLUND ECO AS	4/16/2021	500	NOK	Oslo
ILE DE FRANCE(REGION D')	4/20/2021	500	EUR	Paris
SNCF SA	4/27/2021	500	SEK	Paris

VASAKRONAN AB (PUBL)	4/27/2021	500	NOK	Oslo
SNCF SA	4/28/2021	70	AUD	Paris
SANTANDER CONSUMER BANK AS	4/29/2021	500	SEK	Dublin
AEROPORTI DI ROMA SPA	4/30/2021	500	EUR	Dublin
HEMSÖ FASTIGHETS AB	5/10/2021	400	SEK	Dublin
HEMSÖ FASTIGHETS AB	5/10/2021	300	SEK	Dublin
SANTANDER CONSUMER BANK AS	5/12/2021	500	SEK	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	5/14/2021	71.9	EUR	Dublin
AIB GROUP PLC	5/17/2021	750	EUR	Dublin
VASAKRONAN AB (PUBL)	5/17/2021	500	SEK	Dublin
SNCF SA	5/18/2021	100	USD	Paris
MAS SECURITIES B.V.	5/19/2021	300	EUR	Dublin
VASAKRONAN AB (PUBL)	5/19/2021	250	SEK	Dublin
SWEDBANK AB (PUBL)	5/20/2021	1000	EUR	Dublin
ARLA FOODS AMBA	5/21/2021	1500	SEK	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	5/25/2021	90	USD	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	5/25/2021	10000	JPY	Dublin
AEDAS HOMES OPCO, S.L.U.	5/26/2021	325	EUR	Dublin
ARCELIK A.S.	5/27/2021	350	EUR	Dublin
CAISSE AMORT.DETTE SOCIALE	5/27/2021	4000	USD	Paris
SBAB BANK AB (PUBL)	5/27/2021	500	EUR	Dublin
SBB TREASURY OYJ	5/27/2021	750	EUR	Dublin
SELP FINANCE S.A.R.L.	5/27/2021	500	EUR	Dublin
VASAKRONAN AB (PUBL)	5/27/2021	500	NOK	Oslo
VASAKRONAN AB (PUBL)	5/27/2021	1000	NOK	Oslo
VASAKRONAN AB (PUBL)	5/27/2021	300	SEK	Dublin
KOJAMO PLC	5/28/2021	350	EUR	Dublin
SPAREBANKEN VEST	5/31/2021	1000	NOK	Oslo
CAISSE DEPOTS ET CONSIGNATIONS	6/1/2021	500	EUR	Paris
EDF	6/1/2021	1250	EUR	Paris
TRITAX EUROBOX PLC	6/2/2021	500	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	6/3/2021	30	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	6/3/2021	38.2	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	6/3/2021	38.2	EUR	Dublin
WABTEC TRANSPORTATION NETHERLANDS B.V	6/3/2021	500	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	6/3/2021	30	EUR	Dublin
CITYCON OYJ	6/4/2021	350	EUR	Dublin
SWEDBANK AB (PUBL)	6/8/2021	350	GBP	Dublin
DANSKE BANK A/S	6/9/2021	500	EUR	Dublin
TENNET HOLDING B.V.	6/9/2021	650	EUR	Amsterdam
TENNET HOLDING B.V.	6/9/2021	500	EUR	Amsterdam
TENNET HOLDING B.V.	6/9/2021	650	EUR	Amsterdam
COMMUNAUTÉ FRANÇAISE DE BELGIQUE	6/11/2021	500	EUR	Brussels

AGENCE FSE DE DEVELOPPEMENT	6/11/2021	1500	EUR	Paris
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	6/15/2021	44.3	EUR	Dublin
CAISSE AMORT.DETTE SOCIALE	6/15/2021	4000	EUR	Paris
VASAKRONAN AB (PUBL)	6/15/2021	10	EUR	Dublin
BANCO DE SABADELL SA	6/16/2021	500	EUR	Dublin
TRANSMISSION FINANCE DAC	6/18/2021	300	EUR	Dublin
CTP N.V.	6/21/2021	500	EUR	Dublin
CTP N.V.	6/21/2021	500	EUR	Dublin
AKBANK T.A.S.	6/22/2021	500	USD	Dublin
BANQUE POSTALE (LA)	6/23/2021	750	EUR	Paris
GTC AURURA LUXEMBOURG S.A.	6/23/2021	500	EUR	Dublin
UNEDIC (UNI.INTERPRO.EMPLOI)	6/23/2021	2000	EUR	Paris
BANCO SANTANDER, S.A.	6/24/2021	1000	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	6/28/2021	7	EUR	Dublin
VASAKRONAN AB (PUBL)	6/28/2021	50	USD	Dublin
ASSURA FINANCING PLC	6/30/2021	300	GBP	Dublin
EIDSIVA ENERGI AS	6/30/2021	600	NOK	Oslo
EIDSIVA ENERGI AS	6/30/2021	600	NOK	Oslo
HEMSÖ FASTIGHETS AB	6/30/2021	200	SEK	Dublin
ENGIE	7/2/2021	750	EUR	Paris
ENTRA ASA	7/2/2021	800	NOK	Oslo
ENTRA ASA	7/2/2021	1000	NOK	Oslo
NORGESGRUPPEN ASA	7/6/2021	500	NOK	Oslo
ENTRA ASA	7/7/2021	1000	NOK	Oslo
CARE PROPERTY INVEST	7/8/2021	32.5	EUR	Brussels
momox Holding GmbH	7/8/2021	150	EUR	Oslo
ACTION LOGEMENT SERVICES SAS	7/19/2021	1000	EUR	Paris
COMMUNAUTÉ FRANÇAISE DE BELGIQUE	7/19/2021	50	EUR	Brussels
Aker Horizons ASA	7/22/2021	2500	NOK	Oslo
LEASYS S.P.A.	7/22/2021	500	EUR	Dublin
SalMar ASA	7/22/2021	3500	NOK	Oslo
PUBLIC POWER CORPORATION S.A.	7/26/2021	125	EUR	Dublin
UNEDIC (UNI.INTERPRO.EMPLOI)	7/27/2021	2000	EUR	Paris
ENTRA ASA	8/27/2021	1655	NOK	Oslo
VASAKRONAN AB (PUBL)	8/30/2021	200	SEK	Dublin
VASAKRONAN AB (PUBL)	8/30/2021	400	SEK	Dublin
RIKSHEM AB (PUBL)	9/2/2021	200	SEK	Dublin
LEASEPLAN CORPORATION N.V.	9/7/2021	1000	EUR	Amsterdam
CZECH GAS NETWORKS INVESTMENTS S.Á.R.L	9/8/2021	500	EUR	Dublin
VASAKRONAN AB (PUBL)	9/8/2021	200	SEK	Dublin
BANCO BILBAO VIZCAYA ARGENTARIA, S.A.	9/9/2021	1000	EUR	Dublin
VASAKRONAN AB (PUBL)	9/9/2021	200	SEK	Dublin
EDP – ENERGIAS DE PORTUGAL, S.A.	9/14/2021	500	EUR	Dublin

EDP – ENERGIAS DE PORTUGAL, S.A.	9/14/2021	750	EUR	Dublin
CAISSE AMORT.DETTE SOCIALE	9/15/2021	5000	EUR	Paris
VASAKRONAN AB (PUBL)	9/15/2021	100	SEK	Dublin
KT21 T2 COMPANY LIMITED	9/16/2021	350	USD	Dublin
SPAREBANK 1 HELGELAND	9/20/2021	500	NOK	Oslo
CREDIT AGRICOLE S.A.	9/21/2021	1000	EUR	Paris
FANA SPAREBANK BOLIGKREDITT AS	9/21/2021	600	NOK	Oslo
ABN AMRO BANK N.V.	9/23/2021	1000	EUR	Amsterdam
ENTRA ASA	9/23/2021	2300	NOK	Oslo
ENTRA ASA	9/23/2021	1400	NOK	Oslo
ENTRA ASA	9/23/2021	1150	NOK	Oslo
SPAREBANK 1 HELGELAND	9/23/2021	250	NOK	Oslo
SMURFIT KAPPA TREASURY UNLIMITED COMPANY	9/24/2021	500	EUR	Dublin
SMURFIT KAPPA TREASURY UNLIMITED COMPANY	9/24/2021	500	EUR	Dublin
CTP N.V.	9/27/2021	500	EUR	Dublin
Norlandia Health & Care Group AS	9/27/2021	950	NOK	Oslo
Norlandia Health & Care Group AS	9/27/2021	750	SEK	Oslo
CTP N.V.	9/27/2021	500	EUR	Dublin
VASAKRONAN AB (PUBL)	9/28/2021	1500	SEK	Dublin
AGENCE FSE DE DEVELOPPEMENT	9/29/2021	2000	EUR	Paris
ACTION LOGEMENT SERVICES SAS	10/5/2021	1000	EUR	Paris
RIKSHEM AB (PUBL)	10/5/2021	300	SEK	Dublin
ACCIONA ENERGIA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	10/7/2021	500	EUR	Dublin
FORTUNA CONSUMER LOAN ABS 2021 DAC	10/7/2021	140	EUR	Dublin
FORTUNA CONSUMER LOAN ABS 2021 DAC	10/7/2021	375	EUR	Dublin
RIKSHEM AB (PUBL)	10/7/2021	800	SEK	Dublin
CREDIT AGRICOLE S.A.	10/11/2021	335	EUR	Paris
CBRE GLOBAL INVESTORS OPEN-ENDED FUNDS S.C.A. SICAV-SIF-PAN EUROPEAN CORE FUND	10/12/2021	500	EUR	Dublin
KORIAN	10/15/2021	300	EUR	Dublin
VESTEDA FINANCE BV	10/18/2021	500	EUR	Amsterdam
HERA S.P.A.	10/25/2021	500	EUR	Dublin
ENGIE	10/26/2021	750	EUR	Paris
ENGIE	10/26/2021	750	EUR	Paris
CAISSE AMORT.DETTE SOCIALE	10/28/2021	3000	USD	Paris
GETLINK SE	11/2/2021	150	EUR	Dublin
ALERION CLEAN POWER S.P.A	11/3/2021	200	EUR	Dublin
KREDITTFORENINGEN FOR SPAREBANKER	11/4/2021	190	NOK	Oslo
SOGN OG FJORDANE ENERGI AS	11/5/2021	300	NOK	Oslo
SOGN OG FJORDANE ENERGI AS	11/5/2021	300	NOK	Oslo
SANTANDER CONSUMER BANK AS	11/8/2021	750	NOK	Oslo
SANTANDER CONSUMER BANK AS	11/8/2021	250	NOK	Oslo
TEVA PHARMACEUTICAL FINANCE NETHERLANDS II B.V.	11/9/2021	1100	EUR	Dublin
TEVA PHARMACEUTICAL FINANCE NETHERLANDS II B.V.	11/9/2021	1500	EUR	Dublin

FAURECIA S.E.	11/10/2021	1200	EUR	Dublin
IMMOBEL SA	11/12/2021	125	EUR	Brussels
AXA LOGISTICS EUROPE MASTER S.C.A	11/15/2021	500	EUR	Dublin
AXA LOGISTICS EUROPE MASTER S.C.A	11/15/2021	300	EUR	Dublin
SWEDBANK AB (PUBL)	11/16/2021	1000	USD	Dublin
TENNET HOLDING B.V.	11/16/2021	1000	EUR	Amsterdam
Proximus SA	11/17/2021	750	EUR	Brussels
Nordea Eiendomskreditt AS	11/18/2021	7000	NOK	Oslo
LYSE AS	11/19/2021	300	NOK	Oslo
RIKSHEM AB (PUBL)	11/22/2021	500	SEK	Dublin
Eiendomskreditt AS	11/24/2021	300	NOK	Oslo
TELEFÓNICA EUROPE B.V	11/24/2021	750	EUR	Dublin
STANDARD CHARTERED BANK	11/26/2021	600	KES	Dublin
EDF	11/29/2021	1750	EUR	Paris
VILLE DE PARIS	11/30/2021	300	EUR	Paris
KBC GROEP	12/1/2021	750	EUR	Brussels
KERRY GROUP FINANCIAL SERVICES	12/1/2021	750	EUR	Dublin
CAISSE AMORT.DETTE SOCIALE	12/1/2021	2500	USD	Paris
SOCIETE GENERALE SFH	12/2/2021	1500	EUR	Paris
EDF	12/6/2021	1000	EUR	Paris
VILLE DE PARIS	12/6/2021	100	EUR	Paris
EDF	12/6/2021	100	EUR	Paris
SOCIETE GENERALE	12/9/2021	1000	EUR	Paris
SMAKRAFT AS	12/16/2021	50	EUR	Oslo
BONHEUR ASA	12/17/2021	700	NOK	Oslo
SpareBank 1 Sørøst-Norge	12/21/2021	400	NOK	Oslo
RTE RESEAU TRANSPORT	1/12/2022	850	EUR	Paris
VASAKRONAN AB (PUBL)	1/14/2022	50	USD	Dublin
VASAKRONAN AB (PUBL)	1/14/2022	50	AUD	Dublin
VASAKRONAN AB (PUBL)	1/14/2022	20	CHF	Dublin
BPCE	1/14/2022	750	EUR	Paris
LOGICOR FINANCING S.À R.L.	1/17/2022	500	EUR	Dublin
DNB BANK ASA	1/18/2022	1000	EUR	Dublin
ESB FINANCE DESIGNATED ACTIVITY COMPANY	1/19/2022	500	EUR	Dublin
CAISSE AMORT.DETTE SOCIALE	1/19/2022	6000	EUR	Paris
CTP N.V.	1/20/2022	700	EUR	Dublin
DNB BANK ASA	1/21/2022	1200	EUR	Dublin
SWEIHAN PV POWER COMPANY PJSC	1/21/2022	700.8	USD	Dublin
CPI PROPERTY GROUP	1/24/2022	50	GBP	Dublin
RIKSHEM AB (PUBL)	1/24/2022	300	SEK	Dublin
COFINIMMO	1/24/2022	500	EUR	Brussels
EIDSIVA ENERGI AS	1/25/2022	1000	NOK	Oslo
EIDSIVA ENERGI AS	1/25/2022	500	NOK	Oslo

EIDSIVA ENERGI AS	1/25/2022	500	NOK	Oslo
ISLANDSBANKI HF.	1/25/2022	300	EUR	Dublin
ACCIONA ENERGIA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	1/26/2022	500	EUR	Dublin
CAISSE AMORT.DETTE SOCIALE	1/26/2022	3000	USD	Paris
Sparebanken Møre	1/26/2022	1000	NOK	Oslo
FERDE AS	1/27/2022	600	NOK	Oslo
OP CORPORATE BANK PLC	1/27/2022	500	EUR	Dublin
WEBUILD S.P.A	1/28/2022	400	EUR	Dublin
SYCTOM	1/31/2022	18	EUR	Paris
CAISSE AMORT.DETTE SOCIALE	2/2/2022	5000	SEK	Paris
SUNNDAL SPAREBANK	2/3/2022	75	NOK	Oslo
SBAB BANK AB (PUBL)	2/8/2022	500	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	2/11/2022	30	EUR	Dublin
VASAKRONAN AB (PUBL)	2/11/2022	350	SEK	Dublin
VASAKRONAN AB (PUBL)	2/11/2022	100	SEK	Dublin
CAISSE AMORT.DETTE SOCIALE	2/16/2022	2000	EUR	Paris
BARCLAYS BANK PLC	2/17/2022	0	EUR	Dublin
DANSKE BANK A/S	2/17/2022	750	EUR	Dublin
Solis Bond Company DAC	2/17/2022	130	USD	Oslo
VASAKRONAN AB (PUBL)	2/21/2022	200	SEK	Dublin
HEMSÖ FASTIGHETS AB	2/22/2022	500	SEK	Dublin
RIKSHEM AB (PUBL)	2/22/2022	200	SEK	Dublin
VASAKRONAN AB (PUBL)	2/28/2022	500	SEK	Dublin
STANDARD CHARTERED BANK	3/1/2022	100000	VND	Dublin
VASAKRONAN AB (PUBL)	3/2/2022	150	SEK	Dublin
HEMSÖ FASTIGHETS AB	3/3/2022	150	SEK	Dublin
Lerøy Seafood Group ASA	3/8/2022	500	NOK	Oslo
Lerøy Seafood Group ASA	3/8/2022	500	NOK	Oslo
Lerøy Seafood Group ASA	3/8/2022	500	NOK	Oslo
SPAREBANKEN SØR	3/9/2022	900	NOK	Oslo
SPAREBANKEN SØR	3/9/2022	1100	NOK	Oslo
VESTAS WIND SYSTEMS FINANCE B.V.	3/15/2022	500	EUR	Dublin
VESTAS WIND SYSTEMS FINANCE B.V.	3/15/2022	500	EUR	Dublin
HEMSÖ FASTIGHETS AB	3/16/2022	500	SEK	Dublin
HEMSÖ FASTIGHETS AB	3/23/2022	250	SEK	Dublin
SAMHÄLLSBYGGNADSBOLAGET I NORDEN AB (PUBL)	3/23/2022	260	SEK	Dublin
DNB BANK ASA	3/29/2022	1500	SEK	Dublin
AIB GROUP PLC	4/4/2022	1000	EUR	Dublin
ATENOR	4/5/2022	55	EUR	Brussels
FJELLINJEN	4/7/2022	500	NOK	Oslo
ACTION LOGEMENT SERVICES SAS	4/13/2022	1250	EUR	Paris
HEMSÖ FASTIGHETS AB	4/22/2022	200	SEK	Dublin
CAISSE AMORT.DETTE SOCIALE	5/3/2022	5000	EUR	Paris

VASAKRONAN AB (PUBL)	5/6/2022	200	SEK	Dublin
VASAKRONAN AB (PUBL)	5/10/2022	200	SEK	Dublin
HEMSÖ FASTIGHETS AB	5/10/2022	1000	SEK	Dublin
RIKSHEM AB (PUBL)	5/10/2022	500	SEK	Dublin
HEMSÖ FASTIGHETS AB	5/10/2022	400	SEK	Dublin
KREDITTFORENINGEN FOR SPAREBANKER	5/12/2022	115	NOK	Oslo
POSTEN NORGE AS	5/12/2022	300	NOK	Oslo
POSTEN NORGE AS	5/12/2022	700	NOK	Oslo
BANQUE POSTALE HOME LOAN SFH	5/12/2022	750	EUR	Paris
Wallenius Wilhelmsen ASA	5/16/2022	1250	NOK	Oslo
ALERION CLEAN POWER S.P.A	5/17/2022	100	EUR	Dublin
TENNET HOLDING B.V.	5/17/2022	1250	EUR	Amsterdam
TENNET HOLDING B.V.	5/17/2022	1000	EUR	Amsterdam
TENNET HOLDING B.V.	5/17/2022	850	EUR	Amsterdam
TENNET HOLDING B.V.	5/17/2022	750	EUR	Amsterdam
CAISSE AMORT.DETTE SOCIALE	5/17/2022	3500	USD	Paris
UNEDIC (UNI.INTERPRO.EMPLOI)	5/17/2022	1000	EUR	Paris
AGENCE FSE DE DEVELOPPEMENT	5/19/2022	1500	EUR	Paris
UPM KYMMENE CORPORATION	5/23/2022	500	EUR	Dublin
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	5/24/2022	35	EUR	Dublin
HERA S.P.A.	5/25/2022	500	EUR	Dublin
TELEFONICA EMISIONES S.A.U	5/25/2022	1000	EUR	Dublin
FRANCE EMPRUNT D'ETAT	6/1/2022	4000	EUR	Paris
ABN AMRO BANK N.V.	6/1/2022	750	EUR	Amsterdam
ABN AMRO BANK N.V.	6/1/2022	750	EUR	Amsterdam
HEMSÖ FASTIGHETS AB	6/1/2022	10	EUR	Dublin
RIKSHEM AB (PUBL)	6/2/2022	1000	SEK	Dublin
SBAB BANK AB (PUBL)	6/10/2022	750	EUR	Dublin
SPAREBANKEN VEST	6/10/2022	700	NOK	Oslo
SPAREBANKEN VEST	6/10/2022	300	NOK	Oslo
Statkraft AS	6/15/2022	1500	NOK	Oslo
Statkraft AS	6/15/2022	1000	NOK	Oslo
Statkraft AS	6/15/2022	3000	NOK	Oslo
INTERVEST OFFICES - WAREHOUSES	6/17/2022	45	EUR	Brussels
IMMOBEL SA	6/29/2022	125	EUR	Brussels
ACCIONA FINANCIACIÓN FILIALES, S.A. UNIPERSONAL	7/6/2022	30	EUR	Dublin
CAISSE AMORT.DETTE SOCIALE	7/11/2022	1500	EUR	Paris
COMMUNAUTÉ FRANÇAISE DE BELGIQUE	5/3/2022	600	EUR	Brussels
ILE DE FRANCE(REGION D')	7/19/2027	700	EUR	Paris
AGENCE FSE DE DEVELOPPEMENT	7/21/2022	50	EUR	Paris
Hurtigruten Group AS	7/27/2022	50	EUR	Oslo

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