
International Conference on "Statistics for Sustainable Finance", co-organised with the Banque de France and the Deutsche Bundesbank
14-15 September 2021, Paris, France, hybrid format

Tracking sustainable investment: who is financing who?¹

Francisco Conceição, Rafael Figueira and Pedro Silva,
Banco de Portugal

¹ This presentation was prepared for the conference. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the event.

Tracking sustainable investment: who is financing who?¹

Francisco Conceição, Rafael Figueira and Pedro Silva²

Abstract

Transitioning to a more sustainable economy will undoubtedly require substantial amounts of investment from governments and corporations. Since the last decade, environmental concerns have become a leading trend in the financial world. From the various financial instruments available, climate-linked securities – green bonds – are emerging as one of the leading options to finance this transition. This paper analyses the issuance and holdings of green bonds, with a particular focus in the Portuguese market. Based on market information, we identify the green bonds that have been issued to assess the market size and its characteristics. We find that the majority of green bonds are denominated in euros and dollars, present long maturities, and are awarded investment-grade ratings. In the Portuguese market, from the holders perspective, insurance corporations and pension funds are the main investors in these type of securities, which are mainly issued by non-resident entities. Our analysis focuses on the institutional and economic sectors of both issuers and holders, to assess and track the size and direction of the financial flows.

Keywords: Green bonds, Sustainability, Sustainable finance, Financial markets, Credit rating, Holdings, Euro Area, Portugal

JEL classification: G10, G24, M14, Q56

¹ The views expressed in this article are those of the authors and not necessarily those of the Bank of Portugal

² Statistics Department, Bank of Portugal (fdconceicao@bportugal.pt; rfigueira@bportugal.pt; pmssilva@bportugal.pt)

Contents

Introduction..... 3
 The Paris Agreement – a task for central banks 3
 Financing the transition..... 5
Data..... 6
The Green Bond Market 6
 Maturity..... 7
 Country..... 8
 Currency..... 10
 Economic sector 10
 Credit rating 11
Euro area investment in green bonds 12
The Portuguese case 14
 Green bonds issuance 14
 Portfolios of green bonds and long term debt securities..... 15
Conclusion..... 18
References..... 19
Annex 20

Introduction

Transitioning to a more sustainable and climate-friendly society has become a worldwide priority. Countries see reducing greenhouse gas emissions as an imperative and have committed to adopt the necessary changes. The Paris agreement marked a very important step, by defining clearly the goals that have to be achieved, and how they can be achieved.

The size of investment necessary to finance the transition is one of the major challenges faced, but it has also presented itself as an opportunity for the financial system to reinvent itself and start considering the risks and benefits associated with the transition.

This paper builds on the idea that, to monitor the financial performance of the climate transition, financial regulators and statistical authorities must monitor the investment trends associated with the climate transition in order to mitigate the financial and transition risks, to evaluate if the financial system is being able to match the projected financing needs, and to see who is financing whom.

We focus our analysis on green bonds, since they have rapidly become one of the leading financing instruments for the transition. The first green bond emission occurred in 2007, and in the first half of 2021 the amount outstanding already reached 875 billion euros.

The analysis was performed both on the issuers perspective (who is being financed), and on the holders perspective (who is financing). Europe is currently the leading market in green bonds, with thirteen of the twenty countries with the most amount outstanding. The most relevant economic sectors issuing green bonds have been the financial and insurance sector, public administration, and utilities.

In the end of 2020, Euro area investors held 272 billion euros worth of green bonds (more than 30% of the world total), with the financial system, especially investment funds, being the most representative sector investing in these bonds. Of the green bonds held, around 75% had also been issued by euro area entities.

In Portugal, the first green bond emission occurred in 2019. In the end of the first half of 2021, the amount outstanding was 3.6 billion euros, a small fraction (1.3%) of the total securities market. As for the holdings of Portuguese residents, whereas monetary financial institutions are the largest investor in the overall debt securities market, insurance corporations and pension funds are the largest investor in green bonds.

This paper starts by presenting the motivation to track sustainable financing. Then it presents a worldwide overview of the evolution of the green bond market. The section after looks into the characteristics of Euro area investors. The final section focuses on the Portuguese case, namely its issuances and its investors, comparing overall portfolios of debt securities with the green bond portfolios of resident investors.

The Paris Agreement – a task for central banks

In 2015, nearly every nation in the world came together in Paris to agree on a pathway that would limit the increase in the global average temperature to 2 degrees Celsius above pre-industrial levels, while also pursuing further efforts to limit this increase to 1.5 degrees. Reducing greenhouse gas (GHG) emissions stands out as the main policy

to achieve this objective, with countries having to compromise on specific goals for these reductions.

Reducing GHG emissions without compromising economic development is one of the major challenges faced by countries – in a comprehensive sense: governments, industries, financial corporations, citizens, and so on – especially considering the investments necessary and the rapid pace of change that is demanded. It is generally believed that, despite the considerable amount of investment necessary, not undertaking it (frequently called the “business as usual” scenario) would have major costs that greatly surpass the investment needs. This means that the net benefits of transitioning to a low carbon society make this investment, not only necessary, but also rational.

With that said, one of the objectives also laid out on the Paris agreement was “Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development³”. This objective acknowledges the costs associated with the transition, and the necessity of guaranteeing that those costs have a sustainable and viable way of being financed. This calls out for dynamic and resilient financial systems that are, on the one hand, capable of financing the transition, and on the other hand, able to mitigate transition risks and guarantee financial stability.

This goal can be seen as a call for action for central banks and supervisors, as several of their functions (depending on the legal framework of each country) can be impacted by climate change and the foreseen economic and social transition:

- as monetary authority, they must be aware of the implications of this transition for interest rates and inflation, and even consider adopting climate considerations when conducting monetary policy operations;
- as policy advisors, and particularly when they are also statistical authorities, central banks are responsible for collecting the necessary data to support decision-makers, and inform the public;
- as supervisors, central banks have to guarantee financial stability by making sure that financial institutions are aware and integrate, in their analysis, the risks associated with climate transition.

The new monetary policy strategy of the European Central Bank (ECB), for instance, lays out an action plan to include climate considerations in its strategy. According to the ECB, “Climate change and the transition towards a more sustainable economy affect the outlook for price stability through their impact on macroeconomic indicators such as inflation, output, employment, interest rates, investment and productivity; financial stability; and the transmission of monetary policy⁴”. Also, regarding supervision, the ECB has published a guide on climate-related and environmental risks for banks, and plans to introduce climate-related risks as part of the stress tests regularly conducted.

The Network of Central Banks and Supervisors for Greening the Financial System (NGFS) is also a clear example of the importance of Central Banks and Supervisors for meeting the goals of the Paris agreement. Set up in 2017, and with a growing list of

³ https://unfccc.int/sites/default/files/english_paris_agreement.pdf

⁴ https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210708_1~f104919225.en.html

members, the NGFS aims to “enhance the role of the financial system to manage risks and to mobilize capital for green and low-carbon investments”⁵.

Financing the transition

According to the Organisation for Economic Co-operation and Development (OECD), for infrastructure to be consistent with the two-degree Celsius scenario, investment needs will reach 6.9 trillion dollars (equivalent to 8% of 2019 GDP) per year between 2015 and 2030. The large investment needs in question will require different forms of financing. In addition, transitioning to a more sustainable society will require changes in all economic sectors, across all countries, which means that the financing options will depend greatly on the type of investment and the ability to obtain financing.

One of the key differences between the Kyoto protocol and the Paris agreement is that the former required only developed nations to reduce emissions, with no targets for emerging countries. The Paris agreement, on the other hand, was signed by nearly every country in the world, which poses even more demanding efforts for developing nations: these countries not only have a more limited access to the technologies necessary, but they also typically have less developed financial markets, and less ability to obtain favourable terms for financing.

The two most typical forms of financing are through loans and debt securities. Whereas loans are typically an agreement between a bank and the entity requesting the loan, debt securities are sold in the market, meaning that they can be bought by companies, private individuals, financial institutions and governments. Although these types of instruments are not new, there is a growing trend to earmark them with how the amount raised will be used. Especially for debt securities, since these are accessible to all investors, debt-issuers are growingly disclosing how the proceeds will be invested, hoping to appeal to investors that may share their concerns and priorities. Considering the importance given to tackling climate change, more and more investors are looking to commit their resources to projects they feel will contribute to that end. This has led to the appearance of green bonds, whose importance is growing rapidly, and who are playing a leading role in financing the transition.

Green bonds are debt securities whose proceeds will be used for projects with environmental benefits. They serve, essentially, as a commitment from the green bond issuers to their potential investors. The idea is that investors will not only see these bonds as a personal revenue opportunity, but will also take into account the positive impact of the project being financed.

Green bonds can be issued directly by the entity that will undertake the investment, or can be issued by organisations who will then loan the amounts raised to green-aligned projects. For instance, financial institutions or governments can raise funds by issuing green bonds, and use the proceeds to finance green loans to various different projects and entities.

In order to assure that the climate targets are met, while maintaining financial stability and economic development, it is very important to understand who is requesting financing, and who is providing that financing (who is financing whom?). One of the reasons for this is to see whether all sectors are undertaking the necessary changes,

⁵ <https://www.ngfs.net/en/about-us/governance/origin-and-purpose>

especially those that are most exposed to transition risks. For those that have to undertake the investments, it is essential that they have access to favourable financing conditions that will not put in jeopardy their financial sustainability.

The financing side also has to consider its financial sustainability. On the one hand, to reduce its risks, it has to reduce its exposure to GHG-intensive sectors, but, on the other hand, it must also provide financing for these sectors to transition away from GHG.

Finally, decision-makers such as governments, who have made the compromise of making the necessary transformations in their economies, must support their decisions with the relevant data. They must monitor if the pace of transformation is adequate, the risks for their economies, and their economic development.

Data

There is currently no official statistical classification that identifies which securities are considered green bonds. Therefore, for the purpose of this paper, we used a classification from a commercial provider of market data, from which we extracted a list of ISINs (International security identification number). In total, we identified 4050 debt securities classified as green bonds.

For the section Green bond market, we used information from the ECB's Centralised Securities Database (CSDB).

For the section Euro Area investment in green bonds, we used data from the ECB's Securities Holdings Statistics Database (SHSDB), as of December 2020. This database contains holdings data on a security-by-security level, broken down by diverse classifications. The data used excludes holdings of Central Banks.

Regarding the section The Portuguese case, we used information from the integrated securities database of Bank of Portugal (SIET).

All the analyses, except those that say otherwise, use the amount outstanding (nominal value) in euros for stocks at the end of June, 2021.

The Green Bond Market

The first green bond issuance is considered to have occurred in 2007, when the European Investment Bank (EIB) issued a Climate Awareness Bond (CAB), amounting to 600 million euros, with a 5 year maturity. The amount raised was used by the EIB to finance green projects, mainly related with renewable energy. Since then, the EIB has become a major player in the green bonds market, having raised more than 30 billion euros, in several currencies.

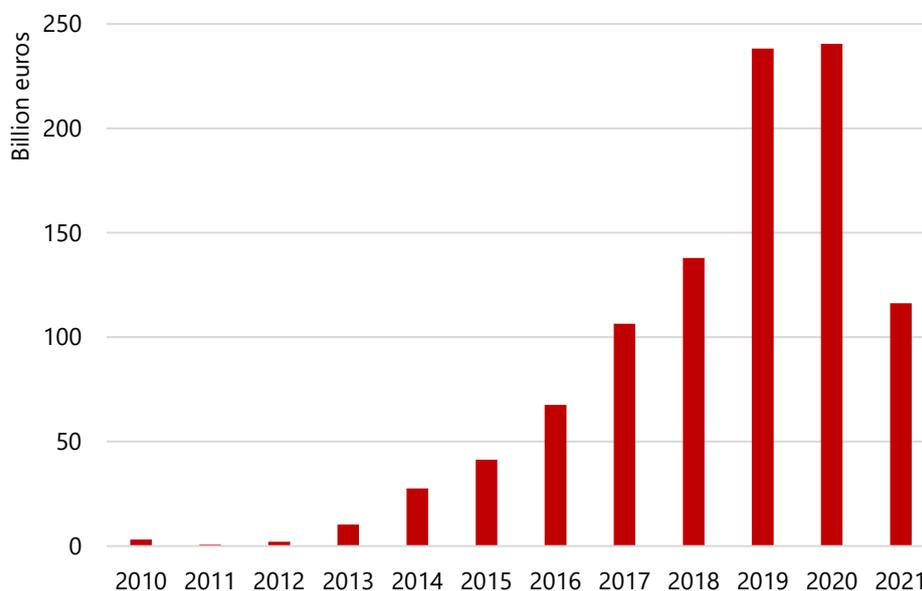
Since 2007, the amount issued per year has been increasing considerably. The amount issued in 2020 is 390 times higher than that of 2007, and almost twice the amount issued in 2018.

In the end of 2020, there had been 850 billion euros worth of green bond issued in the world, with an outstanding amount, at that point, of more than 750 billion euros. As of June 2021, the amount outstanding (AO) was close to 875 billion euros.

Graph 1 shows the amounts issued each year:

Amount issued

Graph 1



Sources: CSDB, IMF Climate Data

Maturity

Since 2016, the amount outstanding for each year is very close to the amount issued on that year, which means that the majority of these bonds has not reached its maturity. In fact, the majority (in terms of amount outstanding) of green bond securities alive as of June 2021 had an original maturity higher than 5 years.

The average original maturity for each bond (average weighted by amount outstanding) is slightly higher than 10 years. Table 1 shows the number of bonds and the total amount outstanding for different intervals of maturity.

In table 2, we split the bonds into four intervals, according to each bond's amount outstanding. This means that, for instance, the first interval contains all bonds whose amount outstanding is between zero and the first quartile of amount outstanding. The second interval contains all bonds whose amount outstanding is between the first quartile and the median, and so on. We then calculated the average (original) maturity for each of the intervals. We can see that the average maturity for the first three intervals is between 8 and 9 years, while previously we saw that the overall average was 10.2. In the fourth interval, however, the average maturity is 10.8 years, which is closer to the overall maturity. This seems to point that the highest value bonds have bigger maturities than the smaller ones.

Amount outstanding by maturity

Table 1

Maturity Range (years)	Amount outstanding (Billion euros)	Number
<=5	280.25	2,049
]5,10]	370.54	1,321
]10,30]	175.87	563
]30,50]	20.61	49
>50	28.05	68

Sources: CSDB

Weighted average maturity by amount outstanding¹

Table 2

Statistic	Amount outstanding (Million euros)	Weighted average maturity
Weighted average by AO	NA	10.2
AO 1st quartile	25.764	8.9 (0-1 st quartile)
AO 2nd quartile	87.209	8.1 (1 st -2 nd quartile)
AO 3th quartile	391.645	8.3 (2 nd -3 rd quartile)
AO Maximum	28 874.000	10.8 (3 rd quartile-max)

¹ This analysis excluded five bonds with a maturity higher than 100 years

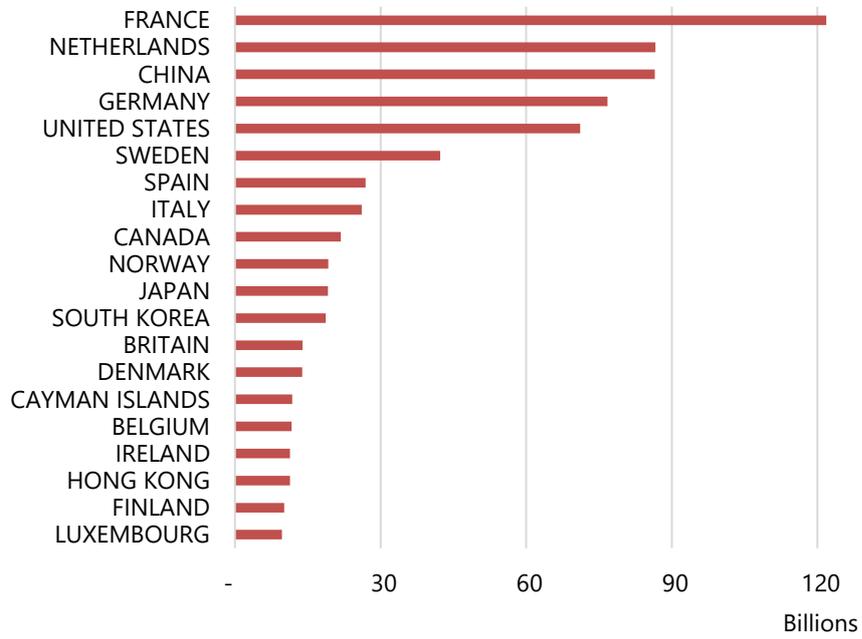
Sources: CSDB

Country

By country of the issuer, France currently holds the lead in terms of amount outstanding: there are more than 120 billion euros worth of bonds that were issued by French entities, almost 14% of the total. In second place is the Netherlands, followed very closely by China, with around 86 billion euros outstanding. Of the top 20 countries, 13 are located in Europe, 4 in Asia, and 3 in North America. These account for more than 80% of total amount outstanding worldwide.

Amount outstanding per country

Graph 2

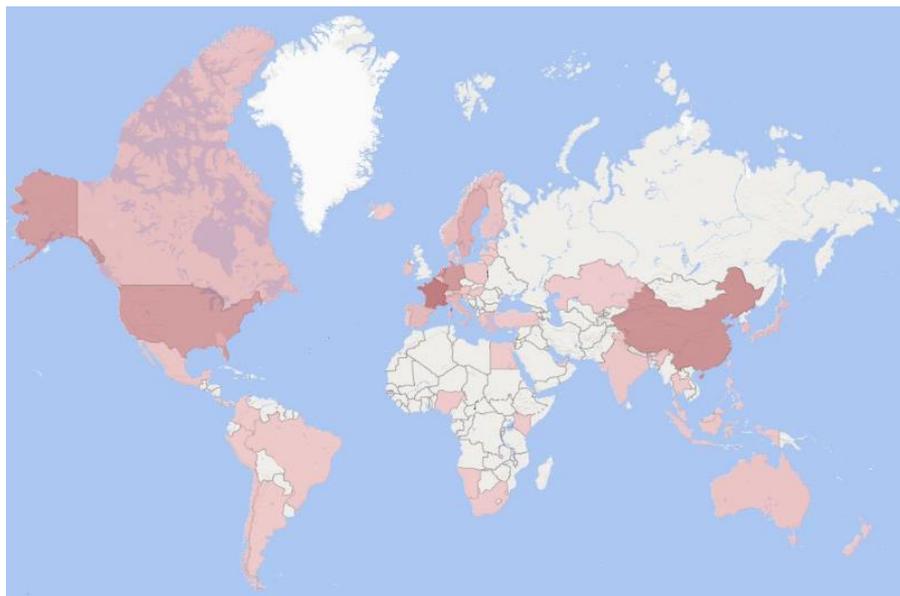


Sources: CSDB

The map below (image 1) represents all the amounts outstanding for every country. The darker the colour is, the bigger the amount outstanding for that country.

Amount outstanding per country

Image 1



Sources: CSDB

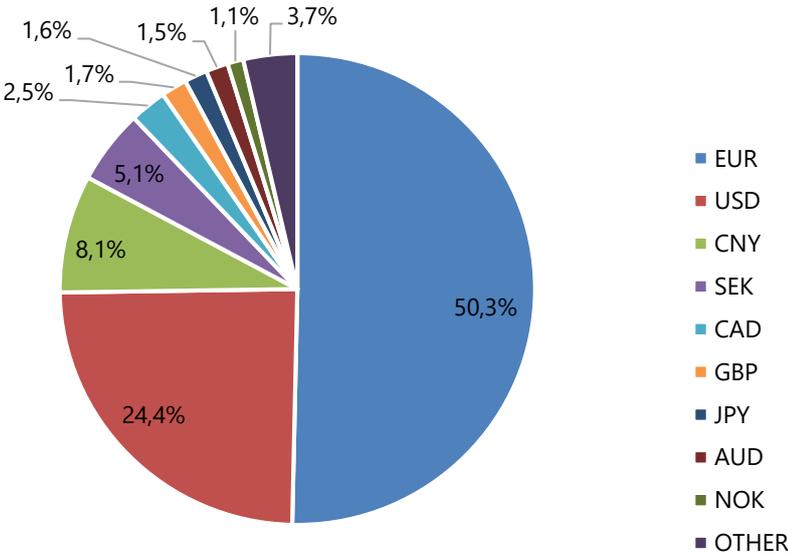
This country analysis excludes supranational organisations, which are very important players in this market. These organisations represent more than 70 billion euros of the total amount outstanding (7.6%). These organisations are comprised mostly of development banks, which use the proceeds from the green bonds issued to finance environmental or sustainable projects. Although the European Investment Bank stands out (since 2017 it has raised more than 30 billion euros in green bonds), there have been green bond issuances from development banks in the various continents. If you were to include this category in the country ranking by amount outstanding, it would be in sixth place.

Currency

Taking into account which countries (and supranationals) have issued the most, one would expect a large proportion of the issuances to be denominated in Euros and US Dollars. In fact, around 50.3% of the outstanding amount is denominated in Euros, followed by the US Dollar (24.4%) and the Chinese yuan renminbi (8.1%). Green bonds have been issued in 37 different currencies.

Amount outstanding by currency denomination

Graph 3



Sources: CSDB

Economic sector

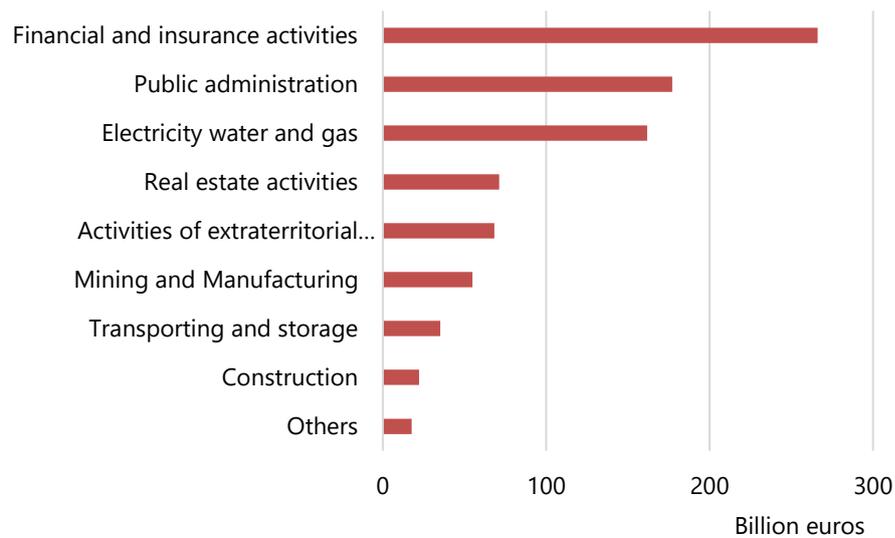
According to the NACE⁶ classification, the majority of the issuers belong to the financial and insurance activities, public administration and electricity, water and gas sectors. These make up around 69% of the total amount outstanding (AO). However,

⁶ Statistical classification of economic activities in the European Community

this information can only tell us the NACE classification of the issuer, but not how the proceeds are used. As mentioned before, financial corporations and public administration often issue green bonds, and then use the proceeds to loan to other entities who will undertake green-aligned projects. This means that the proceeds from a green bond issued by a development bank can be used, for instance, in the manufacturing or industrial sectors.

Green bonds AO by NACE

Graph 4



Sources: CSDB

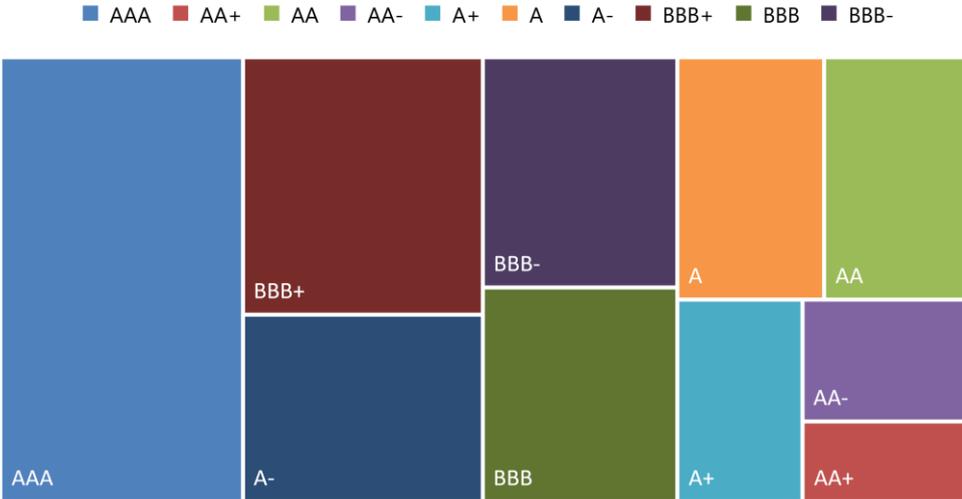
Credit rating

Considering credit ratings, we find that 62% of the amount outstanding (AO) of the green bonds has a rating attributed (equivalent to 26% of the number of bonds). Of those, 89% were attributed a rating considered investment grade⁷, and 25% of bonds received the highest ranking – AAA. The green bonds with a rating considered non-investment grade, account for 60 billion euros of the amount outstanding.

⁷ See table in Annex

Investment grade green bonds AO by Rating

Graph 5



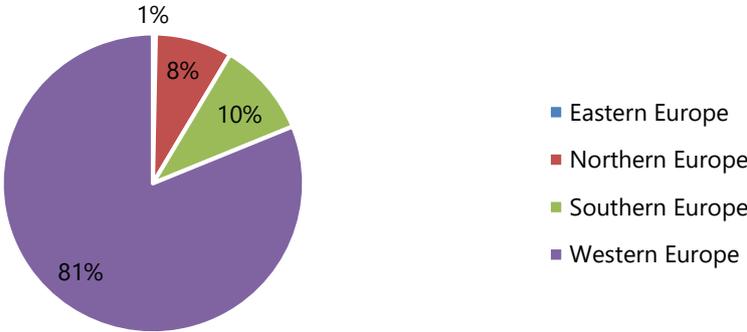
Sources: CSDB

Euro area investment in green bonds

This section presents a characterization of the euro area (EA) portfolios in green bonds. At the end of 2020, euro area investor’s portfolios contained 272 billion euros worth of green bonds. This amount is just a small parcel comparing with the more than 15 trillion euros from all the long-term debt held by euro area investors.

AO of Green Bonds by EA holding's region | Dec 2020

Graph 6

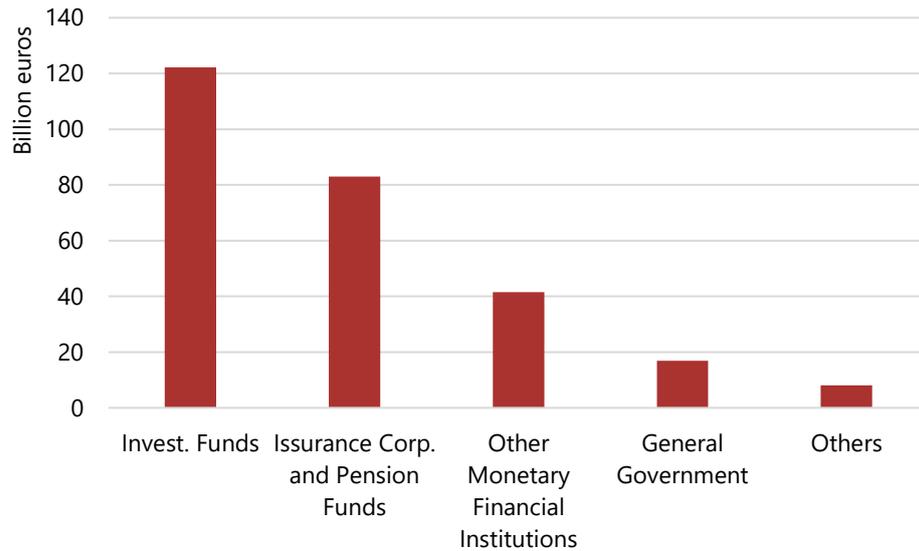


Sources: SHSDB

The major part of green bonds are held by Western Europe investors, representing 81% of the total amount outstanding (AO) held by euro area investors. Southern and Northern Europe presents a similar share of the total of EA holders, with 10% and 8% respectively, while Eastern Europe only represents 1% of EA investment in green bonds.⁸

EA investors in green Bonds AO by holder sector | Dec 2020

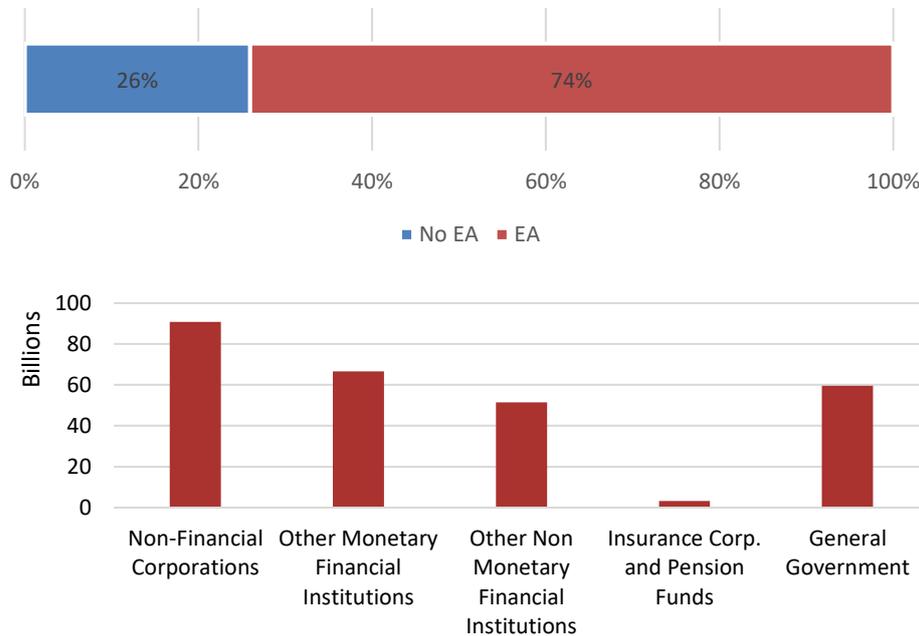
Graph 7



Sources: SHSDB

In terms of the euro area holder's institutional sector, financial corporations hold 92% of the amount outstanding of green bonds, while the non-financial sector (general government, non-financial corporations and private individuals) represented only 8% of the total AO in the end of 2020. Investment funds are the main EA investors in green bonds, holding a stock worth around 122 billion euros, followed by Insurance corporations and pension funds with 83 billion euros. The monetary institutions, excluding central banks, hold 42 billion euros worth of green bonds.

⁸ Euro area countries division based on the statistic standard M49 (United Nations, 1999): Western Europe is composed by France, Germany, Luxembourg, Netherlands, Austria and Belgium; Eastern Europe by Slovenia and Slovakia; Northern Europe by Ireland, Finland, Latvia, Estonia and Lithuania; and Southern Europe by Italy, Spain, Portugal, Greece, Malta and Cyprus.



Sources: SHSDB

Almost three quarters of Euro Area investors' holdings of green bonds is intra-EA, more precisely, 74%. Unlike what we saw for the holding sector, it is the non-financial sectors that have issued the most of the amount outstanding (Non-financial corporations and general government, together, represented 55% of the amount outstanding at the end of 2020). The main issuer are the non-financial corporations, with a stock of 91 billion euros, followed by the monetary financial institutions, general government and non-monetary financial institutions (excluding insurance corporations and pension funds) with 67, 60 and 51 billion euros respectively. Regarding green bonds issued by insurance corporations and pension funds, they only represent 1% of the stocks held by EA investors.

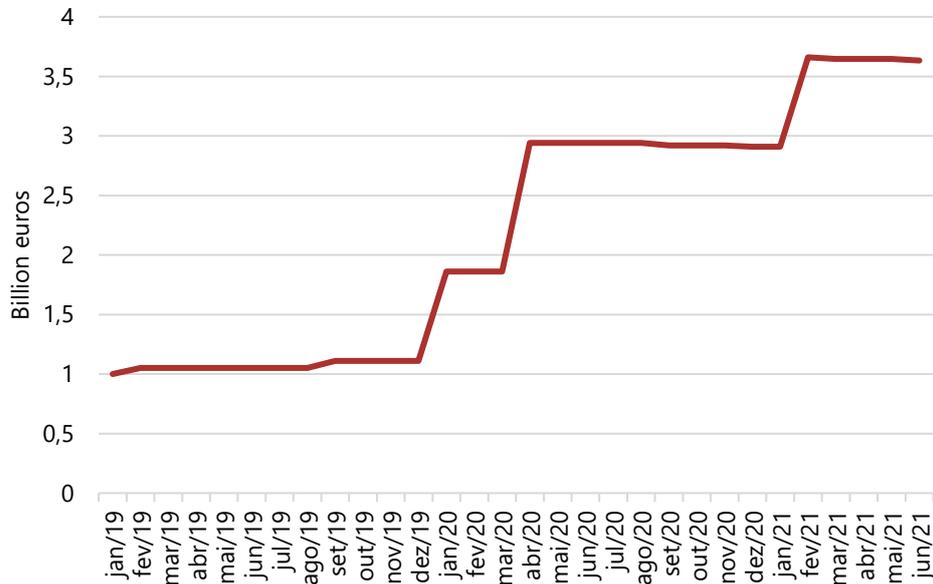
The Portuguese case

Green bonds issuance

The first Portuguese green bond issuance occurred in January 2019, 12 years after the first green bond was issued in the world. In June 2021, the green bonds issued by Portuguese entities amount to approximately 3.6 billion euros, corresponding to 1.3% of the total debt securities amount outstanding (AO).

AO of Portuguese Green Bond Issues

Graph 9



Sources: SIET

The Portuguese issues are mainly from the electricity, water and gas sector (88%), and seem to be linked mainly with long-term projects, since the weighted average maturity is 47 years.

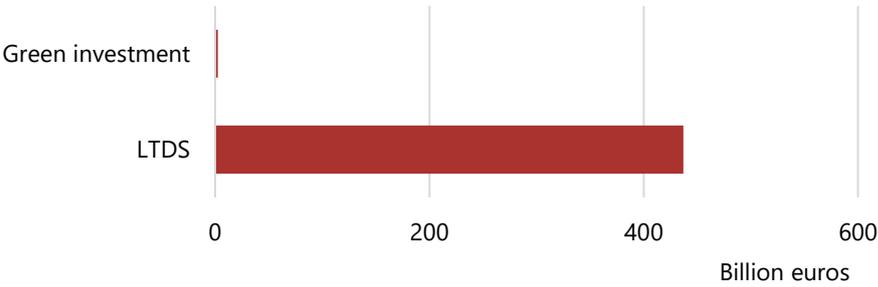
Of the total amount outstanding, 95% is held by non-residents (Since the first issuance, non-residents have always held more than 90% of the amount outstanding). Regarding the resident holders, these are mainly monetary financial institutions (57%) and insurance corporations and pension funds (30%).

Portfolios of green bonds and long term debt securities

In order to compare the Portuguese green bonds investment with the regular investment, we will compare the total holdings of *LTDS* (long-term debt securities), which include the amounts outstanding of all long-term debt securities held by Portuguese residents, and *Green investment* which contains only the outstanding amount of green bonds held by Portuguese resident.

Portuguese resident holdings | Dec 2020

Graph 10



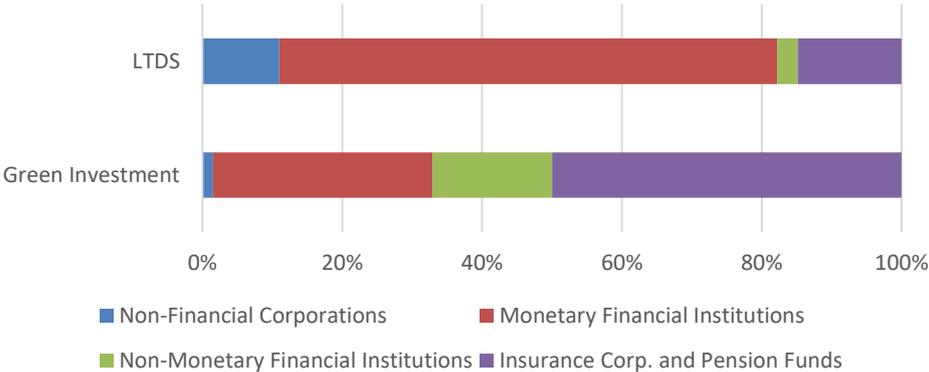
Sources: SIET

Green bonds account for only 2.5 billion euros of the total holdings of 434 billion euros of Portuguese investors, meaning that green bonds only represent 0.6% of the LTDS Portuguese portfolio.

However, the total amount held by investors that have, at least, one green bond in their portfolio is relatively close to the total holdings value (370 billion euros), which means that a large proportion of investors (in terms of size of the portfolio) have invested in green bonds – investors accounting for 85% of total holdings have invested in green bonds.

Portuguese resident holdings by holder sector | Dec 2020

Graph 11



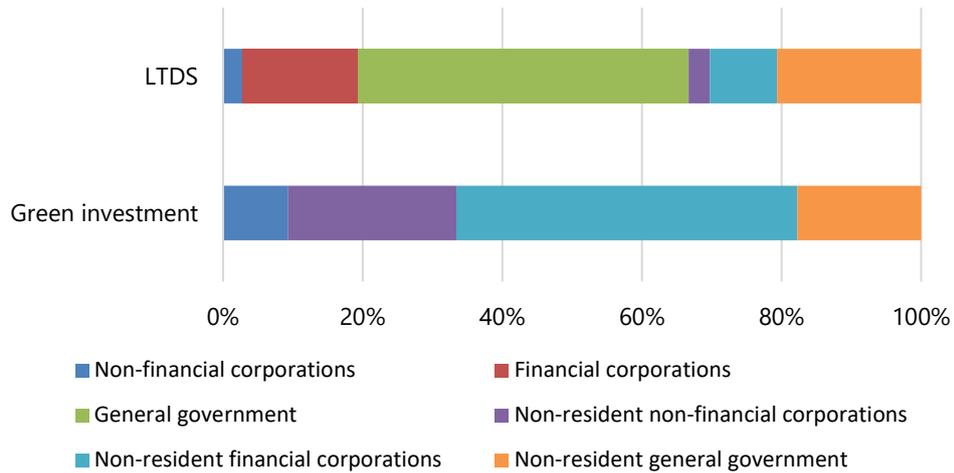
Sources: SIET

Graph 11 details the sectors of resident investors, in terms of portfolio size. The investment in green bonds follows a very different pattern than the overall investment. Overall investment is clearly dominated by monetary financial institutions (71%), followed by insurance corporations and pension funds, and non-financial corporations. On the other hand, the insurance corporations and pension funds sector

is the biggest investor in green bonds (50% of holdings), followed by monetary financial institutions (31%) and non-monetary financial institutions (17%).

Portuguese resident holdings by issuer sector | Dec 2020

Graph 12



Sources: SIET

In terms of the institutional sector of the bond issuers, clear differences are also visible (graph 12): in overall terms, investment is focused mainly on bonds issued by the resident general government, followed by non-resident general government bonds, and resident financial corporations. Green investment, on the other hand, is mostly aimed towards bonds issued by non-resident financial corporations, followed by non-resident non-financial corporations and non-resident general government. Comparing the division between financial and non-financial sectors the difference is evident. In the LTDS portfolio, 73% is issued by non-financial sectors while green bonds portfolios are more balanced, with 51% issued by non-financial sectors.

Focusing solely on residence, 67% of total investment corresponds to bonds issued by resident entities, however, when it comes to green bonds, only 9% of this investment corresponds to green bonds issued by residents. These differences can be explained by the low amounts of green bonds issued by resident entities. For instance, while 47% of overall investment is in bonds issued by the resident general government, there have been no sovereign green bonds issued in Portugal.

NACE of the issuer		
NACE	LTDS	Green investment
Electricity, water and gas	1%	35%
Public administration	62%	18%
Financial and insurance activities	22%	23%
Mining and Manufacturing	3%	5%
Real estate activities	0%	3%
Transporting and storage	0%	3%
Others	10%	13%

Sources: SIET

A similar analysis, can be conducted considering the NACE classification of the issuer, instead of the institutional sector. The results are expected to be similar to the previous ones, although there are some conceptual differences between institutional sector and NACE.

According to table 3, the predominance of securities issued by Public Administration in the green bonds portfolios are significantly lower than in the LTDS portfolios, 18% against 62% respectively. Another highlight is that 35% of the green bonds portfolio are issued by entities belonging to the electricity, water and gas sector, comparing with only 1% from the LTDS portfolios. Financial and insurance activities present an important share in both portfolios, with 23% in the green investment portfolio and 22% in the LTDS portfolio.

Regarding the maturity of debt securities held by Portuguese investors, the weighted average contractual maturity of green bonds is 11 years, two years less than the average maturity for all LTDS.

Conclusion

Our society has committed to transition towards a more sustainable and green environment, setting out ambitious goals, especially to reduce GHG emissions. The task ahead will require large amounts of investment, which presents a challenge for the financial system in particular. For this reason, central banks and supervisors have a particular role in guaranteeing the necessary financing, while preventing the risks associated.

We argue that, to guarantee that the transition goals are met, it is detrimental to know who is financing whom. This allows: to monitor if the financing needs are being met, and at what conditions; to guarantee that debt-issuers and investors are aware of the risks; and to support decision-makers and the public with the relevant data.

This paper focuses on green bonds, which have become a leading source of financing, and intends to demonstrate the need to keep track of this investment. With the first

issuance in 2007, the green bond market is increasing rapidly and has spread worldwide. In June of 2021, the green bonds amount outstanding reached 875 billion euros, with Europe as one of the leading markets. Regarding the issuer sector, the biggest players are the financial sector, public administration and companies engaged in the electricity, water or gas sector, with a combined market share of 69%.

Within the Euro Area (EA), Western Europeans have been the largest investors in this type of bonds (81%), holding 272 billion euros of green bonds. Investment funds have a prominent role, representing almost 50% of the total investment. In fact, the financial sector as a whole is responsible for 92% of investment in EA bonds. Additionally, EA investment is mainly directed towards bonds that were also issued in the EA.

In terms of the Portuguese debt securities market, green bonds represent only 1.3% of the total debt securities amount outstanding. Portuguese green bonds were mainly issued by electricity water and gas sector companies (88%) and present a big weighted average maturity – 47 years. Regarding the Portuguese investors, contrary to what happens in Euro Area, Insurance Corporations and Pension Funds are the main investors in green bonds, mainly issued by non-resident entities (50%).

References

Energy Transitions Commission (2020). Making Mission Possible: Delivering a Net-Zero Economy

Ehlers, T., Mojon, B., & Packer, F. (2020). Green bonds and carbon emissions: exploring the case for a rating system at the firm level. *BIS Quarterly Review*, September.

Gianfrate, G., & Peri, M. (2019). The green advantage: Exploring the convenience of issuing green bonds. *Journal of cleaner production*, 219, 127-135.

Gillingham, K. (2019). Carbon calculus: For deep greenhouse gas emission reductions, a long-term perspective on costs is essential. *Finance & Development*, 56(004).

Kapraun, J., Latino, C., Scheins, C., & Schlag, C. (2021). (In)-Credibly Green: Which Bonds Trade at a Green Bond Premium?. In *Proceedings of Paris December 2019 Finance Meeting EUROFIDAI-ESSEC*.

Leonnec-Serra, L. and Sanna, V. (2021). Everything you wanted to know about sustainable bonds but were afraid to ask, *Crédit Agricole*

OECD (2017). Technical note on estimates of infrastructure investment needs: Background note to the report *Investing in Climate, Investing in Growth*

OECD (2019). *Investing in Climate, Investing in Growth*, OECD Publishing, Paris

Rumpf, G. (2019). *A Decade of Green Bonds—the Origins, the Present and the Future*.

OECD/The World Bank/UN Environment (2018). *Financing Climate Futures: Rethinking Infrastructure*, OECD Publishing

Tuhkanen, H., & Vulturius, G. (2020). Are green bonds funding the transition? Investigating the link between companies' climate targets and green debt financing. *Journal of Sustainable Finance & Investment*, 1-23.

United Nations, Statistics Division (1999). Standard Country or Area Codes for Statistical Use (Rev. 4), Series M: Miscellaneous Statistical Papers, No. 49, New York: United Nations, ST/ESA/STAT/SER.M/49/Rev.4

Zerbib, O. D. (2017). The green bond premium. Available at SSRN 2890316.

Annex

	Rating	
Investment grade	AAA	Highest Quality
	AA+	High Quality
	AA	High Quality
	AA-	High Quality
	A+	Strong payment capacity
	A	Strong payment capacity
	A-	Strong payment capacity
	BBB+	Adequate payment capacity
	BBB	Adequate payment capacity
	BBB-	Adequate payment capacity
Non-investment grade	BB+	Likely to fulfil obligations, ongoing uncertainty
	BB	Likely to fulfil obligations, ongoing uncertainty
	BB-	Likely to fulfil obligations, ongoing uncertainty
	B+	High Credit Risk
	B	High Credit Risk
	B-	High Credit Risk
	CCC+	Very High Credit Risk
	CCC	Very High Credit Risk
	CCC-	Very High Credit Risk
	CC	Near Default
	D	Default

Tracking sustainable investment: Who is financing whom?

Francisco Conceição, Rafael Figueira, Pedro Silva

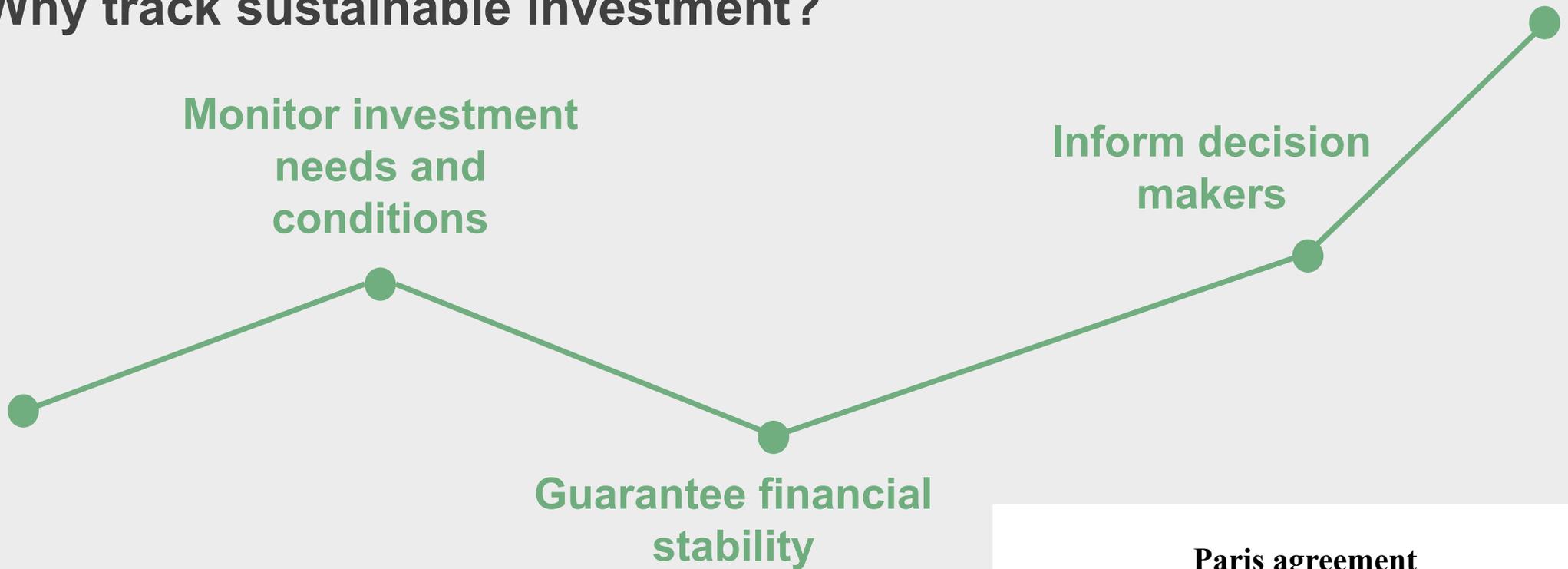


BANCO DE PORTUGAL

International Conference on Statistics for Sustainable Finance
14-15 September 2021, Paris



Why track sustainable investment?



ECB climate-change action plan

...develop new experimental indicators, covering relevant green financial instruments...

Paris agreement

Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.



Green bonds are debt securities whose proceeds will be used for projects with environmental benefits.

First green bond issued: EIB (2007) – €600 million



Amount issued

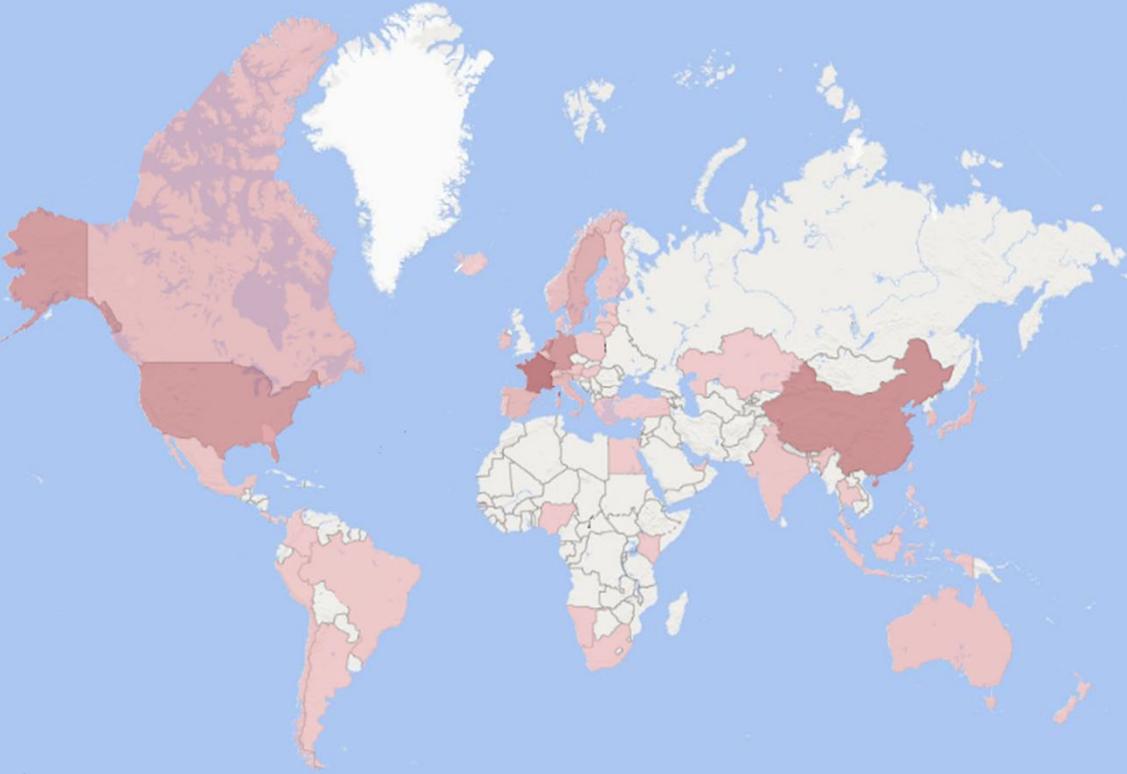


Amount outstanding

€875 billion

June 2021

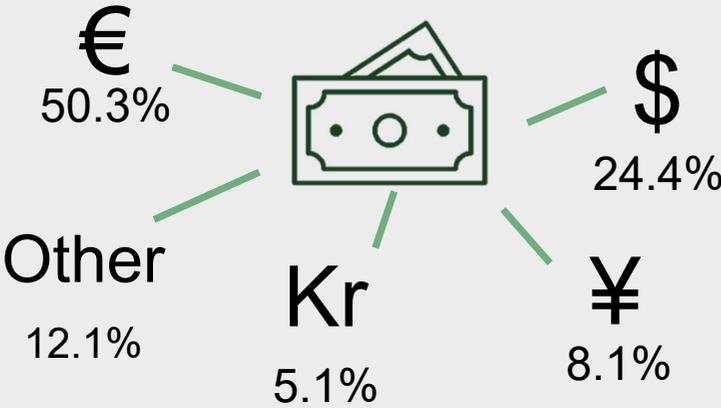
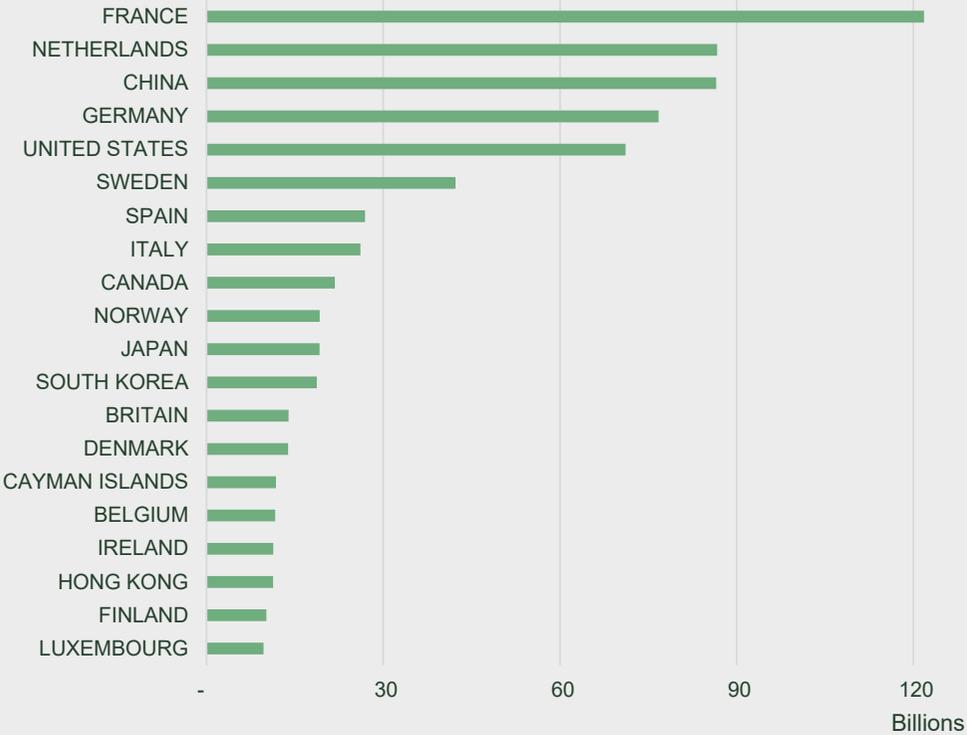
Green bonds have been issued in all continents



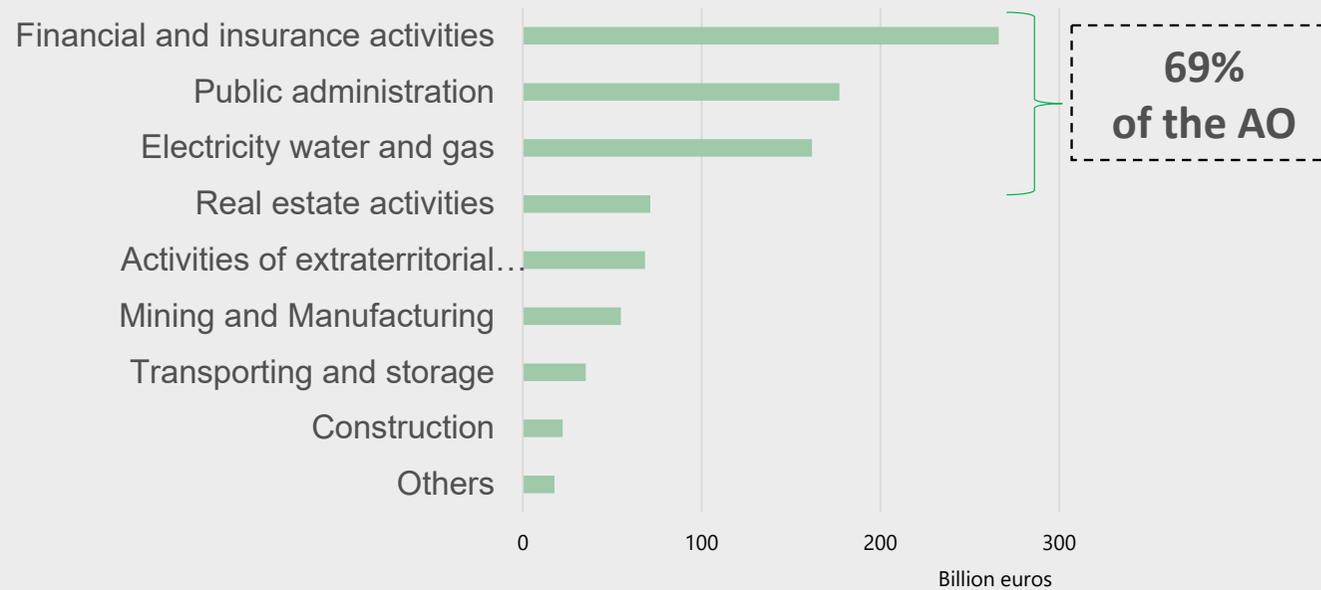
Supranational organisations represent €70 billion of total amount outstanding



Amount outstanding per country



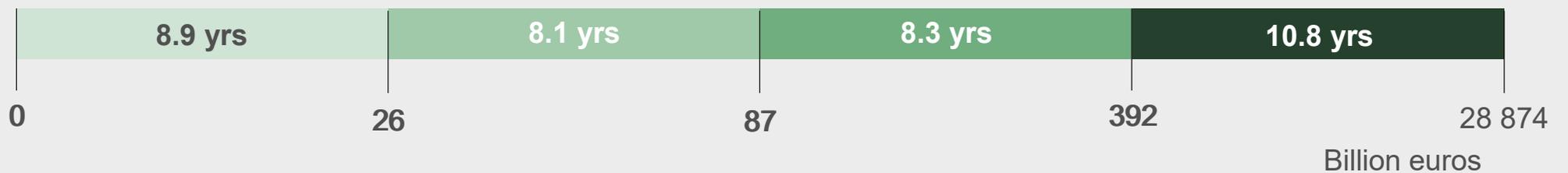
Amount outstanding by NACE



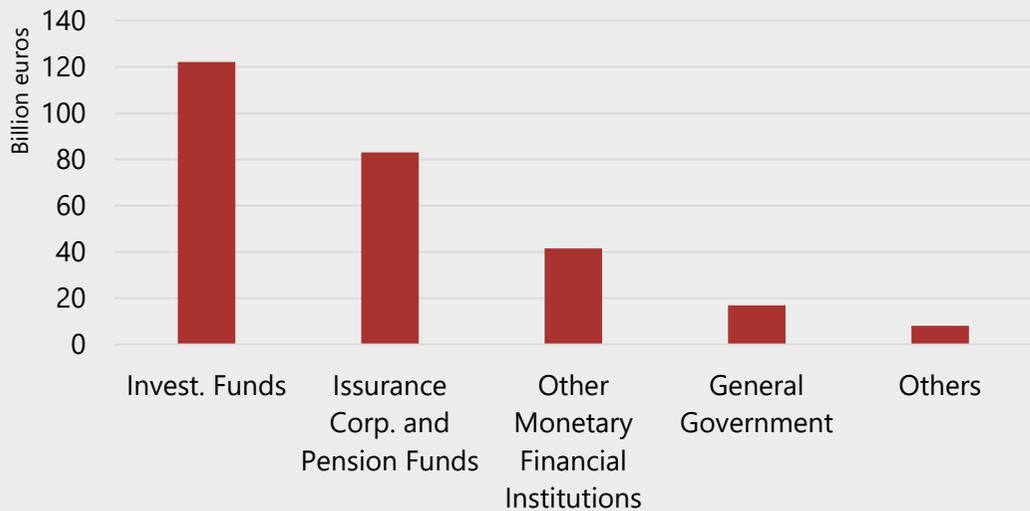
Rating attributed to 62% of AO



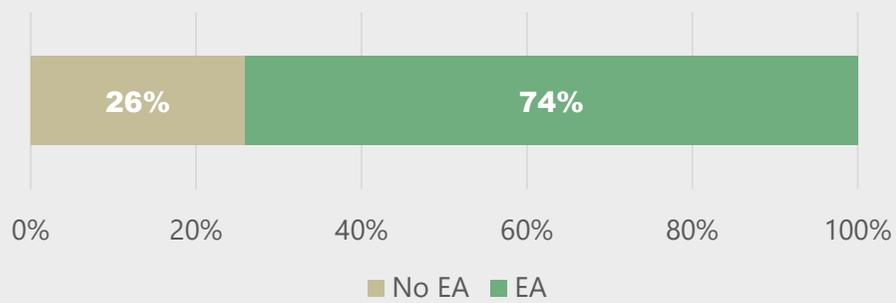
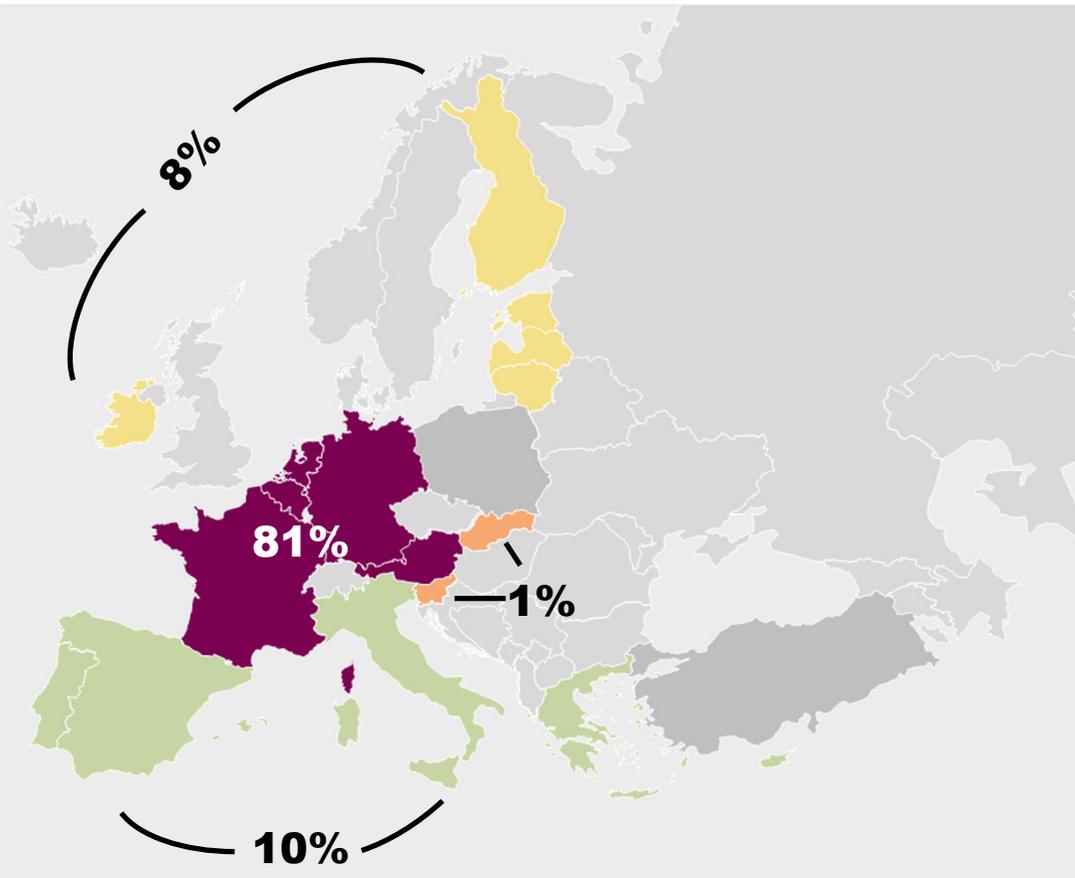
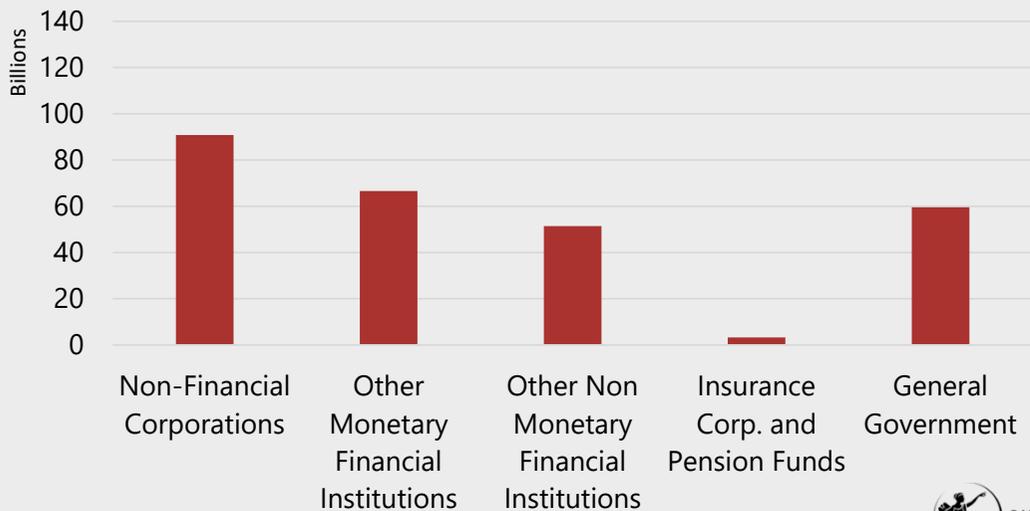
Weighted average maturity by amount outstanding – 10.2 years



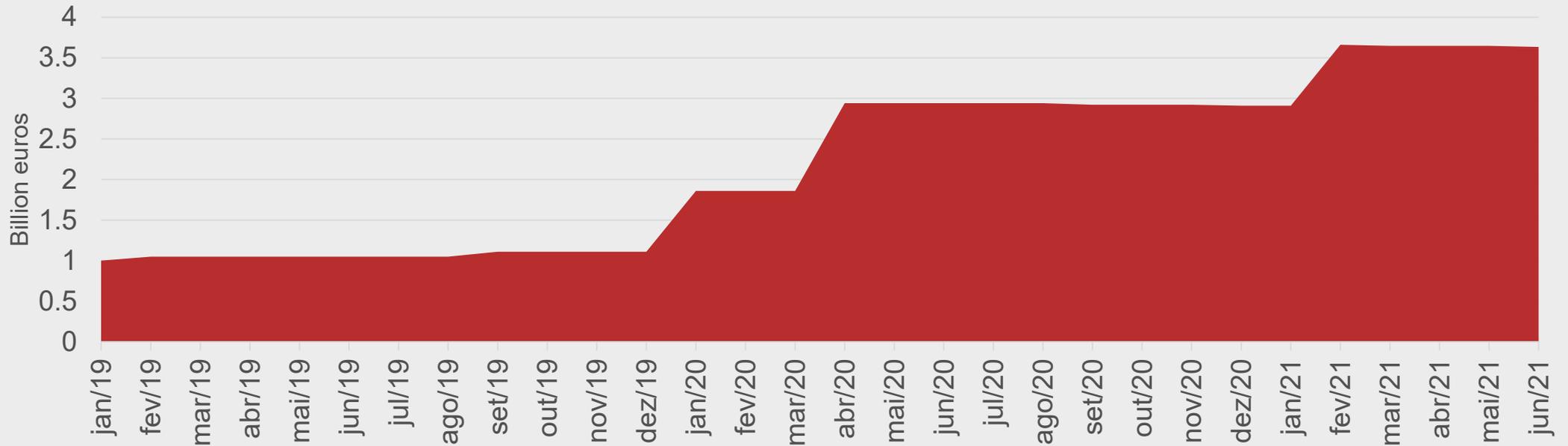
Holder sector



Issuer sector



Portuguese Green Bond Issues | AO



First issue in January 2019

First bond in the hotel sector



47 years

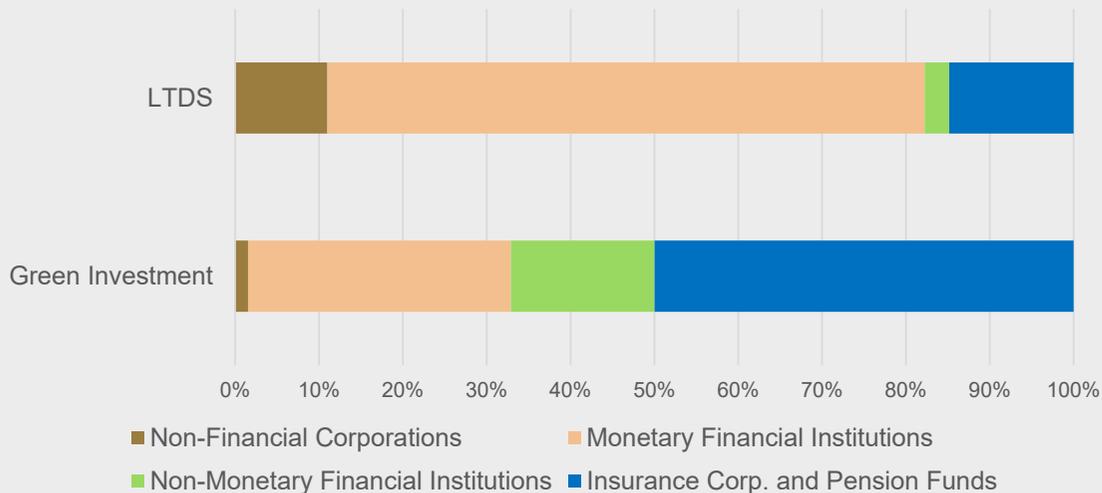


88%

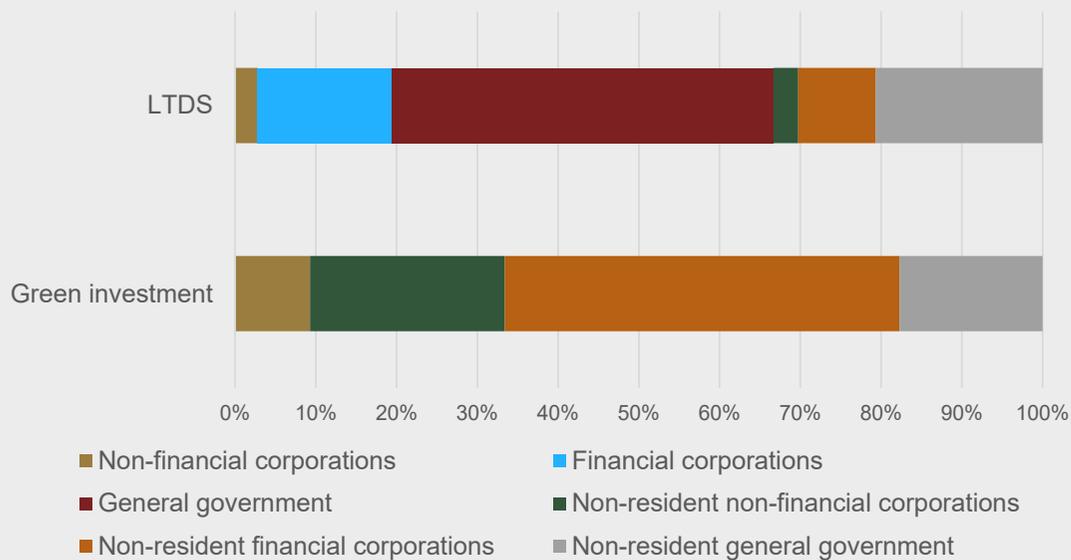


95%

Holder sector



Issuer sector



Resident (PT) Holdings of green bonds

Amount outstanding

€246 billion

December 2020

% of LTDS portfolio

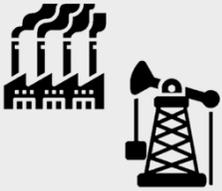
0.6%

December 2020

NACE	LTDS	Green investment
Electricity, water and gas	1%	35%
Public administration	62%	18%
Financial and insurance activities	22%	23%
Mining and Manufacturing	3%	5%
Real estate activities	0%	3%
Transporting and storage	0%	3%
Others	10%	13%

Tracking sustainable investment

We have a clear role to play in supporting the transition towards a more sustainable society



- **Monitor investment needs and conditions**
- **Guarantee financial stability**
- **Inform decision makers**
- **(...)**



THANK YOU FOR YOUR ATTENTION