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**Green Bonds: Are These Instruments Capable
to Pave the Way Towards a Sustainable
Financial Environment?**

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Abstract

Since the late years characterizing the twentieth century the amount of CO₂ emissions showed a positive and increasing trend, that has led both regulators and the public to doubt the maintenance over time of harmful business practices and favour sustainable ones instead. For this reason, the concept of sustainable finance has been evolving in recent years, taking the practical form of Socially Responsible Investments, which combine investors' financial objectives with their concerns towards sustainable matters.

Investors' demand for such sustainable business practices has been met through the issuance of thematic bonds by corporations, financial institutions, and other entities. In particular, the first, and most common, of these instruments has taken the form of a green bond: a fixed income debt security that links the proceeds raised from its issuance to specific sustainable projects. Although the market for sustainable investments was born in 2007 through the issuance of these instruments -that still retain a dominant part of it-, many others have developed since then, exhibiting new technologies that might accommodate different investors' demand.

The most innovative of these, because of its technology, is the sustainability-linked bond: this type of instrument allows the entity to raise funds through its issuance without restricting the use of the proceeds to the financing of exclusively green projects. In fact, issuers are free to allocate the proceeds for any business purpose but commit to achieve sustainable targets in a predetermined period of time, or else a penalty on the coupon rate shall be imposed.

The first entity to issue sustainability-linked bonds was the Italian corporation Enel, that in 2019 decided to change its sustainable financing strategy: in the period from 2017 to 2019 it issued three successful green bonds, but since 2019 it decided to issue exclusively sustainability-linked ones and is working on the adjustment of its source of debt towards an entirely sustainability-linked financing strategy.

The reason for which the Italian company decided to do so is embodied in the belief that since sustainability-linked bonds impose targets on a firm level, rather than the accomplishment of a specific project, these should reflect a true commitment of the issuing entity towards sustainable matters.

If, on one hand, this view is shared by many investors, others might be concerned about the credibility of the issuer in allocating the resources to green practices and might find green bonds to be a better instrument for ensuring that the investment will be devoted for sustainable purposes.

The debate on the primacy between the two is open, and only a deep market analysis can help in establishing a possible advantage of one respect to the other.

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Introduction

If the role of sustainability in the financial sector is gaining importance, on the other hand, the question about which of the available instruments will be able to promote sustainable growth remains open.

Green bonds represent the first instrument issued to tie investment strategies to sustainable practices, and, as such, have been able to establish for themselves a leading position in sustainable markets. However, in recent years, the emergence of other fixed income securities linked to sustainable practices has led to doubt on their primacy. A major threat is posed by the emergence of sustainability-linked bonds: these are perceived as an innovative instrument, able to support the sustainable growth of the issuer in its entirety rather than focusing on specific projects.

This thesis aims at providing a comparative analysis between the market for green and sustainability-linked bonds, and, in particular, at understanding if green bonds possess the necessary features to green the economy, or whether they should leave the floor to sustainability-linked ones. For this purpose, the thesis is divided into three principal areas, analysing the role of sustainability in finance, the markets with a potential to green the economy, and, lastly, a case study on the sustainable evolution of the Italian company Enel.

In the first part of the thesis, I introduce the role of sustainability in finance to provide the reader with a general idea on the emergence and evolution of concerns related to harmful business practices that have led investors to be more sensible towards sustainable matters.

In fact, the amount of CO₂ emissions since the late 1950s has increased to the point that intervention from authorities was necessary: the Paris Agreement of 2015 and the adoption of the Sustainability Development Goals are the result of combined fight against climate change. Since the adoption of these two initiatives, states world-wide have showed an increasing involvement in sustainable practices, with the United States and Europe combined representing more than 80% of global sustainable investing share.

Sustainable investing can take different forms, but the focus of this paper relates to thematic bonds, which comprehend green, sustainability, sustainability-linked, and social bonds. These are regulated, on a voluntary basis, by the ICMA principles, which promote transparency through clear reporting standards to enhance investors' trust in the green instruments.

Currently green bonds appear to be the ones with largest issuance volumes, but sustainability-linked ones have showed the highest growth rate, especially in the 2019/2021 period.

In part two, the previous hints on market conditions are resumed and furtherly developed, to provide for an analysis of the markets for green and sustainability-linked bonds.

In fact, to assess which of the two markets shows greatest potential to green the economy various aspects are taken into account: the market development and forecasts for each instrument, their state of reporting, and the establishment across countries and currencies of each.

Results on market development and forecasts show that the whole sustainable market is expected to grow in 2023. Green bonds should be the leaders of this growth, while sustainability-linked instruments appear to be at an inflection point: challenges in terms of credibility should be addressed.

For what concerns the state of reporting, this has been included in the discussion as it enhances issuers' transparency, signalling the true commitment of the issuer towards the sustainable matter, and thus favouring investors' trust. In general, the most common type of reporting concerns Use of Proceeds (UoP), against impact, reporting.

Across countries, both green and sustainability-linked bonds appear to be well established. The focus is devoted to US, China, and the European countries; these last ones appear to be particularly favoured, in terms of short-term green market growth, since the European Union has decided to respond to the pandemic crisis with the launch of a recovery plan aiming towards a more resilient and sustainable Europe.

Europe has always presented a strong sustainable attitude, and, as such, it represents the most advanced source of sustainable investment policy measures. For this reason, it is not surprising that investors trust European green and sustainability-linked bonds, and that the euro was the most preferred currency. The US dollar is the second most favoured one.

Since the sustainable bond market is, relatively, a recent one, issuers' characteristics are carefully scrutinized by investors when deciding to devote their resources to green investments. A larger diversification establishment in the range of issuers of green bonds can be viewed respect to sustainability-linked ones. The differences, however, should not lead to premature conclusions, as it should be kept in mind that the latter instruments have only been first issued in 2019, and thus have had less time to establish themselves across issuers.

The main challenge posed for both instruments is related to credibility. In the case of green bonds, investors might doubt that proceeds raised through their issuance will be used for sustainable practices; and, in that of sustainability-linked ones, that the company is putting an effort to become more sustainable and reach the pre-determined targets. In both cases, we speak of fear of

greenwashing: the phenomenon of redirecting the proceeds for purposes different from the sustainable one. The threat posed by it is particularly significant due to the pressure imposed on issuing entities to achieve the net zero target by 2050, that requires massive sustainable investment increases in the following years.

The use of blockchain technology is analysed, as it could enrich the relationship between investors and issuers since it enhances transparency and lower the cost of sustainable bond issuance.

The matter of cost for issuers related to sustainable instruments has been closely monitored over the years. In fact, since the sustainable instruments that are discussed are debt securities, and as such require periodic interest payments and the repayment at maturity of the principal, the question of whether issuers of sustainable bonds have access to lower cost of financing is much debated. Such a phenomenon implies the existence of the greenium, that consists in a lower interest rate attached to sustainable bonds respect to their conventional peers. The observing of the greenium is analysed for to both green and sustainability-linked bonds, since both instruments are generally characterized by large amounts of oversubscription.

Enel's case is developed in part three of the thesis, since the company was the first issuer of sustainability-linked bonds in 2019. Enel had started its sustainable financing evolution in 2017 through the issuance of green bonds, but two years later it decided to switch towards the sustainability-linked instruments, driven by the idea that the latter embody a deeper commitment of the firm in the sustainable matter.

Enel monitors its sustainable progress mainly through two key performance indicators related to SDG 7 and 13: its aim is to achieve full decarbonization by 2040. Of course, other short and medium-term targets are established, and in the case that the company should fail to reach them it has agreed to pay a 25-basis points penalty on the coupon rate of its sustainability-linked bonds.

Such a possibility seems a remote option for Enel, as it has always been involved in the sustainable matter and can be considered as the world leader in the sustainable bond market.

Probably one of the most important features allowing for the company's primacy is embodied by its transparency in reporting, promoting investors' trust. In fact, considering overall features, it can be said that Enel embodies an example for those corporate issuers aiming at achieving a sustainable financial strategy.

1. The Role of Sustainability in Finance

1.1. The Concept of Maximization of Wealth in Today's Scenario

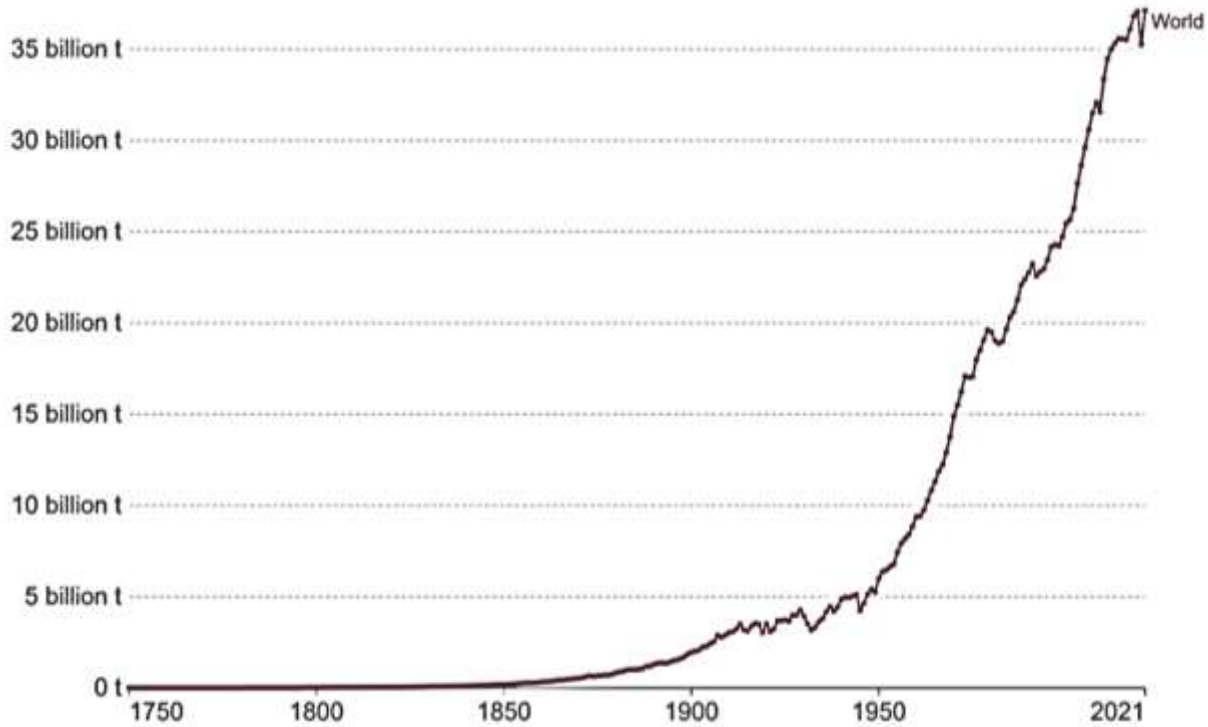
Theories related to the financial and capital markets fields, throughout the years, have tended to reduce the complexity of finance and the investment process, to the point that interaction among agents, optimization, and value creation have all been reduced to mathematical and statistical operations. Human behaviour has been considered bounded to follow a set of assumptions, with the final goal of reaching optimal allocation in capital markets. According to this system, it is clear how an agent, the human being, has no role to play as a personality but is guided by specific rules towards an objective criterion for value creation, that ultimately will lead to maximization of wealth. A misplacing of the individual, along with his social needs, out of the centre of the economic game, seems apparent: were this the actual framework, it would be clear that the financial environment admits no space for the inclusion of ethical or moral values. Fortunately, although it seems not common in finance to elaborate on ethics, it is implicitly part of it.

Even before the market for corporate charters developed in the middle of the 19th century, those that were called chartered companies, the equivalent of what today we know as corporations, provided for the privilege of limited liability¹ to those individuals that contributed towards the capital structure of the business: the investors. Such a privilege was guaranteed since both the sovereign and the public received huge benefits from the activities engaged by the business. Thus, the link between corporate structure and public benefit appears clearly since the nascent ages of the corporate form. But it is only in most recent periods, mainly over the last decades, that due to the combination of multiple factors, namely the increase in concern towards the greenhouse effect, COVID-19 crisis, and climate changes, both issuers and investors' sensitivity towards social and environmental issues has been growing in concern. This situation led, in turn, to the creation of policies that directly affect long term business practices², aiming at paving the way for a more sustainable financial environment. It was during the 1990s, times of particular significance concerning the increase of sensitivity towards sustainability matters, that the role of ethics and moral principles in the financial environment saw a development thanks to the first initiatives

¹ The concept of limited liability embodies legal protection for shareholders of a corporation, which cannot be held personally liable for the company's financial losses or debts.

² The main initiatives that influence current sustainable business practices comprehend the Paris Agreement and the Sustainable Development Goals, furtherly explained throughout the next section.

proposed by different entities³, and the concept of sustainability was reformulated as a concept of justice between existing and future generations. This idea was probably influenced due to the sudden increase in the CO₂ emissions, which characterized all the period starting after the 90s, as the graph⁴ shows.



Due to the urgency of a response to this critical situation, the most important contribution to the development of the concept of sustainability, in this emerging period, was provided in 1997 by the Kyoto Protocol at the United Nations framework convention on climate change, where the discussion narrowed down to the question on how to cope with the worldwide greenhouse effect and man-made climate change: studies of the Intergovernmental Panel on Climate Change (IPCC, 2007) warned on the disastrous consequences of this effect, and as a result, the Stern report of 2007 made it clear that the economic challenge would be particularly difficult and that capital markets would be the ones that have to carry the burden of converting the economies towards greater climate friendliness.

³ In 1987, the United Nations installed the World Commission of Environment and Development (WCED), and the Brundtland – Commission formulated the concept of sustainable development together with the following United Nations Conference on Environment and Development (UNCED), held in 1992.

⁴ Fossil Emissions measure the quantity of carbon dioxide (CO₂) emitted from the burning of fossil fuels, and directly from industrial processes. Fossil CO₂ includes emissions from coal, oil, gas, cement, steel, and other industrial processes. Source: Our World Data on the Global Carbon Project (2022).

Financial sustainability thus appears as necessary not only because of the imminent challenge that must be overcome against climate change, but also because it represents an opportunity for the development of modern technologies and innovative products to cover long lasting needs⁵.

Growing trends towards a more sustainable financial landscape, thus hide behind the following reasons:

- Environmental concerns: as the awareness for environmental issues increases, people and organizations are recognizing the need to shift towards more sustainable practices. Financial organizations are also included in this discussion, since investors' concerns seem to make them search for entities in which to invest that are committed to reducing their environmental impact.
- Social responsibility: especially considering these times, this point could have not been more appropriate. Peoples' concerns towards social issues are increasing rapidly, and so the number of investors concerned with the social impact of their investments is growing as we speak⁶. Investors want to support companies that have a positive impact on the society, such as those who promote diversity and inclusion, or community development.
- Regulatory pressure⁷: governments and other regulatory bodies are putting pressure on the financial sector to prompt the engaging of more sustainable practices. As I explain in the next paragraph, environmental, social and governance performance factors (ESG) are highly valued, so regulation requirements towards their disclosure are rapidly developing.
- Financial performance: there is evidence that companies which adopt sustainable practices tend to perform better, compared with those who do not⁸. Investors, that are both sensible towards social and environmental issues, and want their investments to be profitable,

⁵ Finance is the engine of development of infrastructure projects, including energy projects, these being most reliant on fossil fuels. See Sachs Jeffrey D., Taghizadeh-Hesary Farhad, Woo Thye Wing, Yoshino Naoyuki, ADBI WORKING PAPER 917, *Why Is Green Finance Important?* (2019).

⁶ Classifying generations according to decreasing age levels in 69+, Baby Boomers, Gen X, and Millennials, these last ones have shown most interest towards sustainability matters, since they believe that investment decisions help to express political, social, and environmental values. The study was made by U.S. Trust Insights on Wealth and Worth, 2014, Harvard Business Review (October 3, 2014), Morgan Stanley (on-line presentation August 9, 2017), Visual Capitalist (on-line presentation August 11, 2017), and DNB (2017). See Inderest Georg, Stewart Fiona, WORLD BANK GROUP PUBLICATION, *Incorporating Environmental, Social and Governance (ESG) Factors into Fixed Income Investment* (2018).

⁷ Even though sustainable regulation appears to be implemented on voluntary basis, developed countries seriously concerned with environmental matters have committed on the achievement of sustainable goals, among which the leading target is that of a stabilization to a 1.5°C maximum increase in the global temperature. Key targets agreed upon are found in the Paris Agreement and Sustainable Development Goals report.

⁸ This result comes from the consideration of green bond issuance as a proxy for firms making sustainable investments; issuers' stock prices increase significantly when announcing a green bond issuance, however this phenomenon is stronger for first time issuances rather than repeated ones. See Tang Dragon Yonjun, Zhang Yupu, SSRN, *Do Shareholders Benefit from Green Bonds?* (2018).

recognize this, and thus look for opportunities to invest in companies that are committed towards sustainable goals.

Considering the overall situation presented, the trend towards sustainable finance should not come as surprise to us. As it is in the nature of the corporate form to serve a wider purpose than that of maximizing profits, and investors are becoming more aware of the critical environmental situation currently faced, it is natural to expect financial mobilization towards the achievement of sustainable goals. Recognizing the importance of combining sustainability with long-term business practices helps the wider economy in its development by creating a new view of what ‘value’ means for investors: the goal is the one to combine both the achievement of sustainable objectives with profitable financial opportunities.

1.2. Socially Responsible Investments and ESG Factors

Socially Responsible Investments (SRIs) represent the most practical side of what we broadly define as sustainable finance. The most appropriate formulation characterizing the essence of SRIs is the one that states that SRIs combine investors’ financial objectives with their concerns about social, environmental, ethical, and corporate governance issues⁹.

The seeking of SRIs from the part of investors, as they strive to gain a social return, is known as impact investing: a type of investment linked to social businesses, that may allow for the acceptance of a lower return respect to the attainable one on capital markets, leading to the idea of a social time value of money. The possibility of earning a higher return on capital markets, however, should not lead to the wrong idea that these are contrasting with a sustainable framework: they play a vital role in the channelling of investments by contributing both to economic growth and development, and there can be neither one nor the other if the present needs are not met. In this respect, it is important to identify with clarity what ESG factors are, and how their integration is facilitated through thematic investments’ increase, such as green, social, and sustainable bonds.

⁹ Provided by the European Social Investment Forum (EUROSIF), that advocates at the EU level for a more responsible and sustainable finance.

ESG¹⁰ investing incorporates environmental, social and governance issues into the analysis, selection, and management of investments. Environmental issues mainly concern climate change, carbon emissions, pollution, resource efficiency and biodiversity; social ones comprehend human rights, labour standards, health and safety, diversity policies, educations, and community relations; lastly, governance issues are about corporate governance, corruption, rule of law, institutional strength, and transparency. On the market place, there are many different and specific definitions for ESG criteria, for this reason we can affirm that a definitive list does not exist and it looks impossible to agree on: markets, technologies, policies, values, and social preferences change over time, from country to country, and even within countries; therefore, an open and dynamic approach should be kept in mind when defining investments as ‘green’ or ‘sustainable’. ESG investing has gained much consensus over the past years, due to the increase in sensitivity towards environmental and social matters, both on behalf of investors and institutions. This attitude contributed to the development of the sustainable investing topic, to the point that different initiatives undertaken by institutions have been promoted and widely accepted by the public:

- The Paris Agreement¹¹. It represents a legal document, entered into force in 2016, that poses as the main goal that of limiting global warming to below 2°C, compared to preindustrial levels. The agreement has represented the driving force of state legislations to limit greenhouse emissions.
- The Sustainable Development Goals (SDGs). These comprehend seventeen goals to achieve a more sustainable future by 2030 and were adopted by all Member States of the United Nations in 2015. A total of 169 targets and 231 indicators concerning social matters, must be all achieved while tackling the problem of climate change. Although the SDGs are a state-based framework, businesses and investors have also been encouraged to adopt the SDG framework.

Surely the acceptance of these two initiatives has positively impacted practices concerning sustainable finance, in fact the increasing consensus that these types of investments have been gaining in the period starting from 2014 can be viewed in the table¹² below.

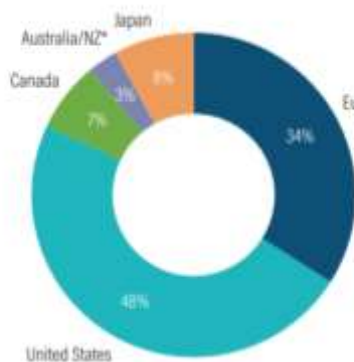
¹⁰ The term ESG was popularized by ‘Who Cares Wins,’ a report published in 2004 by a group of investment firms organized by the United Nations. The report offered recommendations on how to better incorporate ESG matters into various activities, such as asset management, brokerage services, and related research.

¹¹ Signed at the United Nations Climate Change Conference (COP21), at the time of writing 195 parties have signed, and 189 parties have ratified the agreement.

¹² Asset values are expressed in billions. Source: Global Sustainable Investment Review (2020).

	2014	2016	2018	2020	GROWTH PER PERIOD			COMPOUND ANNUAL GROWTH RATE (CAGR) 2014-2020
					GROWTH 2014-2016	GROWTH 2016-2018	GROWTH 2018-2020	
Europe* (EUR)	€9,885	€11,045	€12,306	€10,730	12%	11%	-13%	1%
United States (USD)	\$6,572	\$8,723	\$11,995	\$17,081	33%	38%	42%	17%
Canada (CAD)	\$1,011	\$1,505	\$2,132	\$3,166	49%	42%	48%	21%
Australasia* (AUD)	\$203	\$707	\$1,033	\$1,295	248%	46%	25%	36%
Japan (JPY)	¥840	¥57,056	¥231,952	¥310,039	6,692%	307%	34%	168%

From this table, it emerges that the period 2014/2016 has been particularly significant for sustainable investments' growth especially for Canada, Australasia, and Japan; Europe and the United States appeared to be in an advantageous situation at that time. For the last period, ending in 2020, Canada was the country that overall grew mostly in sustainable investment practices, immediately followed by the United States. The only country that reports a negative trend for the last period is Europe¹³, but with its exception, the amount of issued sustainable investment assets has continued to climb globally: at the start of 2020, global sustainable investments reached \$35.3 trillion, considering the five major markets: Europe, United States, Canada, Australia, and Japan. For this reason, it can be stated that reported sustainable investment assets under management make up for a total of 35.9% of total assets under management in the supra mentioned countries. Differences on the cumulative amount of dollars invested in sustainable assets in the major countries can be immediately noticed by looking at the data¹⁴ reported below, representing a snapshot of the global situation.



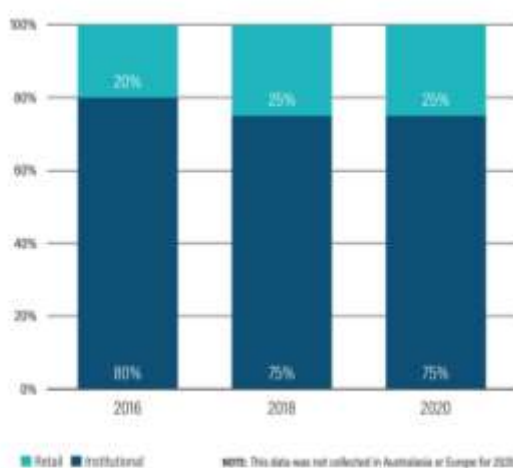
REGION	2016	2018	2020
Europe*	12,040	14,075	12,017
United States	8,723	11,995	17,081
Canada	1,086	1,699	2,423
Australasia*	516	734	906
Japan	474	2,180	2,874
Total (USD billions)	22,839	30,683	35,301

¹³ Europe seems to be facing a decline in the amount of registered sustainable investments. This is due to the significant changes that are being implemented in EU legislation concerning the definition of sustainable development. The European marketplace is in constant transition; therefore, it is difficult to draw definitive conclusion on trends. See GLOBAL SUSTAINABLE INVESTMENT ALLIANCE, *Global Sustainable Investment Review (2020)*.

¹⁴ Asset values are expressed in billions of US dollars. Source: Global Sustainable Investment Review (2020).

The results show that United States and Europe together represented more than 80% of global sustainable investing share during the period starting in 2018 until 2020.

The actual future performance of sustainable practices will obviously depend on the choices of those who are called to allocate their resources: the investors. Investors' portfolio decisions can be driven by risk management motivations, as well as reasons related to expected future trends, or also some other purpose; in fact, we can classify at least three different types of ESG investors: those whose sole purpose remains the financial performance, thus believing that investing in ESG related projects may have materially positive effects on risks and returns; the ones that try to combine certain non-financial objectives without hampering financial ones; and, lastly, there are investors willing to sacrifice some degree of financial return to achieve a beyond purpose¹⁵. Furthermore, retail investors can be distinguished from institutional ones. The formers represent those individuals who own professionally managed funds, purchased in banks or investment platforms, that generally require for low minimum investment levels; the latter instead embody much greater investment capacity, since they are represented by large entities such as pension funds, hedge funds, and insurance companies they hire professionals to manage large sums of money and have high minimum investment requirements. Although institutional investors dominate financial markets, increasing sensitivity towards sustainable matters on behalf of retail investors has been signalling an increase in the share of sustainable retail investors relative to institutional ones since 2016, recording an increase from 20% to 25% as shown in the graph¹⁶ below, and that has remained constant during the period 2018/2020.



¹⁵ This classification has been provided by the World Bank Group. See Inderest Georg, Stewart Fiona, WORLD BANK GROUP PUBLICATION, *Incorporating Environmental, Social and Governance (ESG) Factors into Fixed Income Investment* (2018).

¹⁶ This data accounts for United States, Canada, and Japan. Europe and Australia are excluded due to their changing regulation for sustainable investments occurring in most recent years. Source: Global Sustainable Investment Review (2020).

The coexistence of different investors in sustainable financial markets naturally leads to a difference in the types of green securities that they demand. For this reason, ESG investing is being implemented under several forms by investment managers and asset owners: for some investors, ESG investing is limited to the use of ESG products, such as green bonds, and, more generally, thematic bonds, or in SRI funds; others decide to passively follow ESG indexes for some asset classes; and many go down the route of selecting active ESG managers¹⁷. For the purpose of this thesis, the focus will be centred on thematic bonds.

1.3. Defining and Measuring Green Investments

1.3.1 ICMA Guidelines

Thematic bonds are those fixed income securities that link the proceeds raised by their issuance to specific themes, sectors, or projects¹⁸. Related to the ESG context, such instruments can be classified according to two main types¹⁹: green bonds, and sustainability bonds. Another ESG debt instrument that does not fall into the definition of thematic bond should be considered: the sustainability-linked bond²⁰.

The absence of a generally required standard that clearly defines characteristics of sustainable investments does not allow for a precise identification of green projects. However, as 98%²¹ of sustainable bond issuers refer to the International Capital Market Association (ICMA) Principles, these can be considered as the voluntary standard of the market, and, as such, shall be referred to when defining and measuring sustainable investments during this thesis.

Green bonds are any type of bond instrument where the proceeds will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible green projects and which are

¹⁷ This classification, provided by the Authors of the World Bank Group, underlines the level of ESG integration, going from the lowest (use of ESG products) to the highest (selection of active ESG managers). See Inderest Georg, Stewart Fiona, WORLD BANK GROUP PUBLICATION, *Incorporating Environmental, Social and Governance (ESG) Factors into Fixed Income Investment* (2018). Page 32, Figure 6.

¹⁸ See Inderest Georg, Stewart Fiona, WORLD BANK GROUP PUBLICATION, *Incorporating Environmental, Social and Governance (ESG) Factors into Fixed Income Investment* (2018). Page 32.

¹⁹ The classification should involve a third type of thematic bond: the social bond. However, for the purpose of this thesis we shall focus on green and sustainable thematic bonds, along with sustainability-linked bonds.

²⁰ Sustainability-linked bonds do not fall in the definition of thematic bonds as the proceeds raised by their issuance are not tied to specific projects. SLBs present an innovative structure that allows to achieve ESG targets, relying on the commitment of the issuer. SLBs are explained later in the paragraph.

²¹ Data from June 28th, 2022. Source: The International Capital Market Association Group, The 8th Annual Conference of the Principles (28 June 2022). See [Green Bond Principles & Social Bond Principles Annual Conference | Events | ICMA » ICMA \(icmagroup.org\)](https://www.icmagroup.org/Principles/2022-Annual-Conference/)

aligned with the four core components of the Green Bond Principles (GPB)²². There are four core components for alignment with the GBP:

- Use of Proceeds. The main feature characterizing green bonds is the use of proceeds that must be devoted exclusively to finance green projects. Eligible green projects should be explicitly described in legal documentation of the security and should provide for clear environmental benefits.
- Process for Project Evaluation and Selection. Issuers of green bonds should communicate to investors the sustainable targets of the eligible green projects; and the process for determining how projects are eligible as green projects.
- Management of Proceeds. Proceeds of green bonds can be managed through a per bond approach, or an aggregate basis. The GBP require high degree of transparency, thus recommending the review of an external auditor.
- Reporting. Issuers should periodically (at least annually) upload up to date information. The annual report should include a list of the projects to which green bond proceeds have been allocated.

Sustainability bonds, on the other hand, are bonds where the proceeds will be exclusively applied to finance or re-finance a combination of both green and social projects; these are aligned with the four components of GBP and Sustainability Bond principles (SBP)²³, as the former are particularly relevant in underlying green projects, while the latter define social ones²⁴.

Lastly, sustainability-linked bonds (SLBs) are any type of bond instrument for which the financial and/or structural characteristics can vary depending on whether the issuer achieves predefined sustainable objectives²⁵. In this respect, SLBs represent a forward-looking performance-based instrument, according to which the issuer commits explicitly towards future improvements in sustainability matters. The Sustainability-Linked Bond Principles are made of five core components:

²² This definition is provided by the most recent report on Green Bond Principles issued by the ICMA Group. See ICMA GROUP, *Green Bond Principles. Voluntary Process Guidelines for Issuing Green Bonds* (2022).

²³ Since the thesis does not deal with social bonds, the four core components of these instruments shall only here be presented. Alignment with the Social Bond Principles requires: Use of Proceeds, Process for Project Evaluation and Selection, Management of Proceeds, Reporting. See ICMA Group, *Social Bond Principles Voluntary Process Guidelines for Issuing Social Bonds* (2021).

²⁴ This definition is provided by the most recent report on Sustainability Bonds issued by the ICMA Group. See ICMA GROUP, *Sustainability Bonds Guidelines* (2021).

²⁵ This definition is provided by the most recent report on Sustainability- Linked Bonds issued by the ICMA Group. See ICMA GROUP, *Sustainability-Linked Bond Principles Voluntary Process Guidelines* (2020).

- Selection of Key Performance Indicators (KPIs). Credibility of SLBs crucially depends on KPIs selection. These indicators allow for the assessment of the success of SLBs performance, for this reason they should be core to the overall business, measurable, externally verifiable, and able to be benchmarked.
- Calibration of Sustainability Performance Targets (SPTs). This component is fundamental in representing the level of ambition that the issuer is willing to commit to. SPTs should be set in good faith, and the issuer should disclose any information that can impact the achievement of the target.
- Bond Characteristics. The element that distinguishes SLBs from other sustainable thematic instruments is that the structure of the SLB can vary depending on whether the issuer is able to achieve the predetermined SPTs, assessed by the KPIs.
- Reporting. SLBs issuers should regularly publish up to date information on KPIs, and any information that allows investors to monitor the level of ambition of STPs.
- Verification. Issuers should seek for independent and external verification of their performance level for all SPTs, and such verification should be made publicly available for investors.

Table 1²⁶: Key Sustainable Bond Instruments

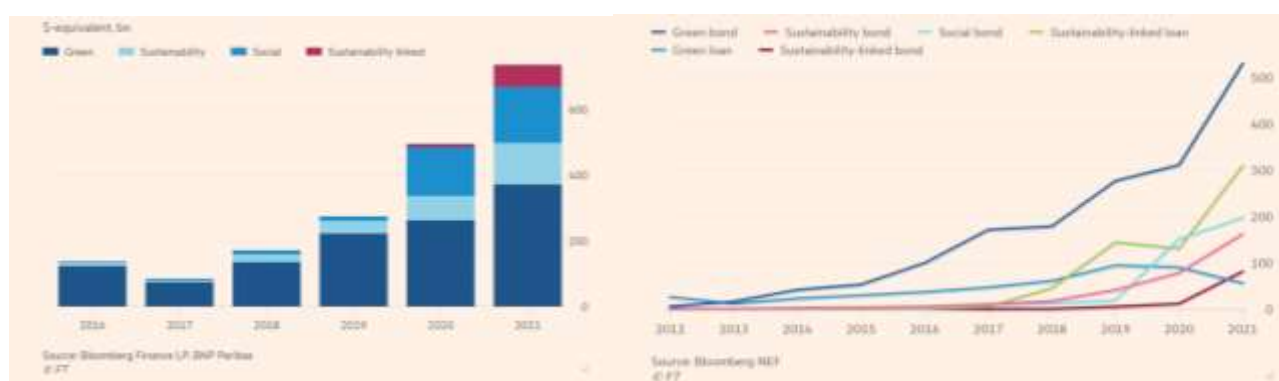
	Green Bonds	Sustainability Bonds	Sustainability-Linked Bonds
Framework	ICMA Green Bond Principles (2022)	ICMA Sustainability Bond Guidelines (2021)	ICMA Sustainability-Linked Bond Principles (2020)
Use of Proceeds	YES	YES	NO
Reporting	YES	YES	YES
Bond Structure	FIXED	FIXED	VARIABLE
Market Size	USD 1.6 + trillion	USD 350 + billion	USD 180 + billion

²⁶ Table 1 presents an overview on the main differences between sustainable bonds. Data account for most recent periods, up to March 2023. Source: ICMA, also based on Bloomberg data.

1.3.2 A Presentation on the Current State of Sustainable Bond Markets

Green bonds were first issued by the European Investment Bank in 2007, and in 2008 the World Bank and the Swedish Bank SEB issued these instruments for an amount of USD 440 million. After these first issuances, numerous have followed: in 2016 Poland was the first country to issue sovereign green bonds, and since then, the market for these securities has been growing rapidly. The combination of issuances of green bonds signalled the starting point for the development of the entire new market dedicated to sustainable finance, and over time evolution allowed for the inclusion of new instruments, such as sustainability, and sustainability-linked bonds.

Green bonds not only have initiated the market for sustainable bonds, but they also represent the instrument that has been growing at the highest rate over the years, as the graphs²⁷ show.



Comparing the issuance in the first half of 2022 respect to the first half year of 2021, data suggest a 21% decline in the amount of green debt issued, from USD 277.5 billion to USD 218.1 billion²⁸. However, the drop was not unexpected, considering post Covid-19 inflation concerns and the market volatility caused by the Russian invasion of Ukraine.

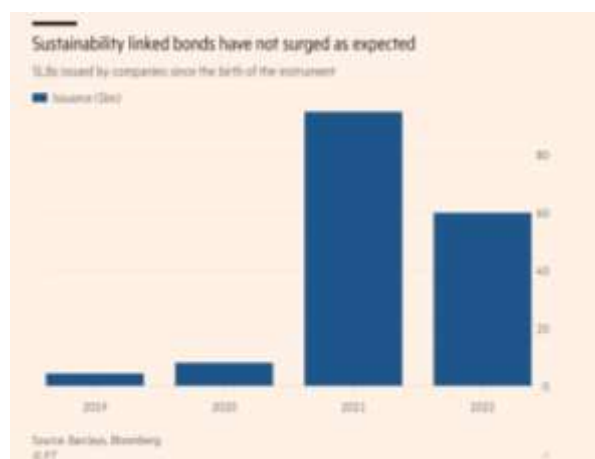
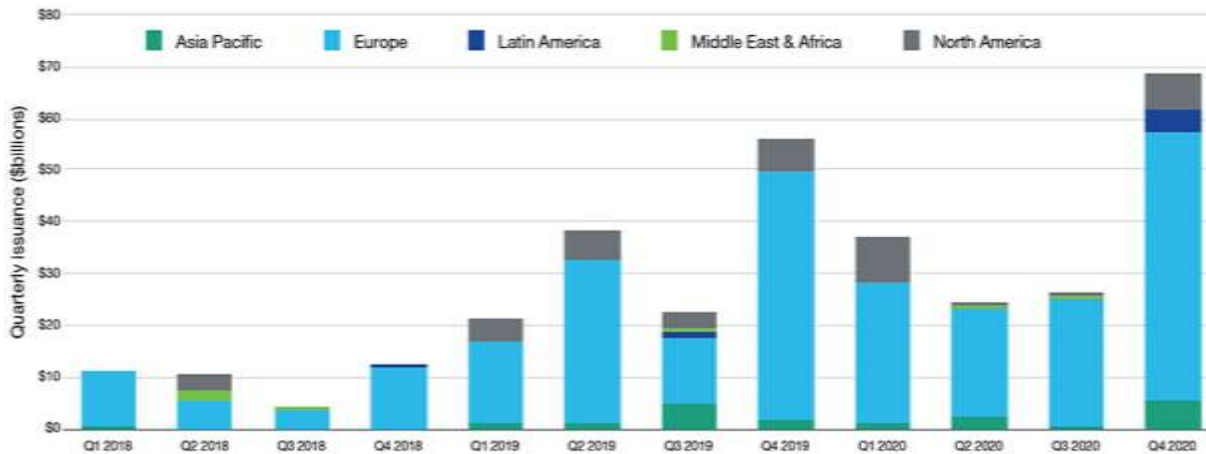
While one could think that the lower amount of issued green bonds during 2022 may also be influenced by a shift of preferences towards sustainability-linked bonds, actually 2022 was a negative year also for this innovative instrument, since it counted for a total issuance of USD 60 billion all over the world, a 37% decline respect to 2021, and a far lower amount than the expected USD 200 billion²⁹. Expectations towards SLBs have been set high because, since their first issuance

²⁷ Levels of issuance by instrument type are expressed in USD billions. Source: Bloomberg NEF; Bloomberg Finance LP, BNP Paribas; Financial Times.

²⁸ This data has been recorded in the Climate Bonds Green Bond Database (GBDB). See CLIMATE BOND INITIATIVE, *Global State of the Market Report 2022*. (2023)

²⁹ The multinational headquartered bank Barclays had expected an issuance for 2022 of more than \$200 billion. Source: Financial Times.

by the Italian company Enel in 2019³⁰, these innovative instruments appeared to perform particularly well in financial markets, especially for the period starting from the last quarter of 2020, and lasting until all the successive year, as the graphs³¹ show.



This year's data related to both green bonds and sustainability-linked bonds appear to be quite interesting, since sustainable bond issuance in the first three months of 2023 hit volumes comparable to record-breaking ones of 2021. In fact, according to market data, total sustainable issuance reached USD 260 billion, making the first quarter of 2023 the third quarterly highest issue as compared to the first two quarters of 2021³². These numbers in sustainable markets have been achieved thanks to a robust performance by green bond markets, as well as sustainability-linked bond ones. Indeed, green bonds were able to obtain 57% of total sustainable bond issuance, with a

³⁰ Which counts for a total of 27 SLBs issued up to February 2023. Source: Financial Times.

³¹ The first graph refers to sustainability-linked loans, made also of SLBs stating from 2019. It reflects a general trend towards this innovative debt instrument. The second graph is specific to sustainability-linked bonds. Both graphs express the issued amount in USD billions. Source: Environmental Finance; Bloomberg, Financial Times.

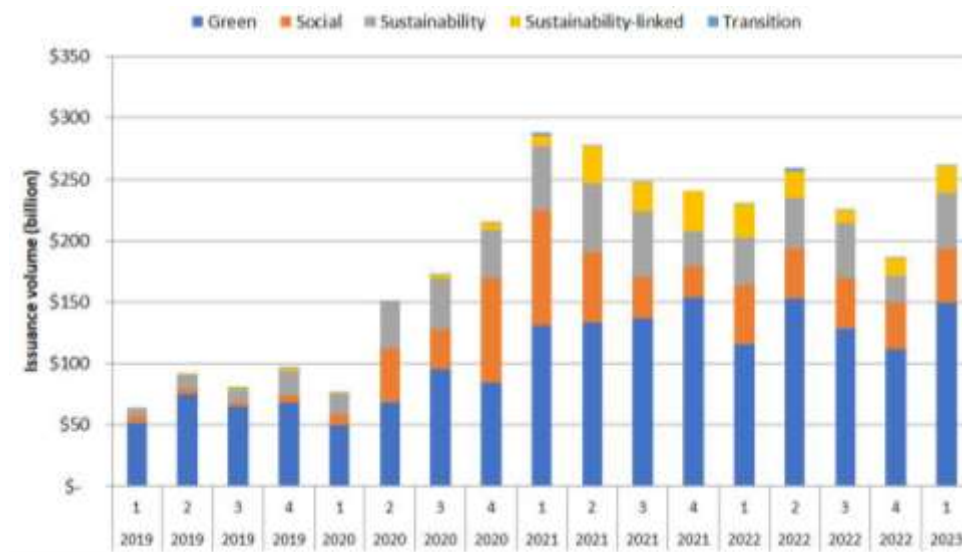
³² Source: Environmental Finance Data. See Lester Ahren, ENVIRONMENTAL FINANCE, *Sustainable bond issuance stages comeback in first quarter 2023*. (2023)

corresponding issued amount of USD 150 billion³³, as compared to the 56% held in 2022, and 52% in 2021. Furthermore, when considering different countries as sources for sustainable investments, leading countries for green bond issuance are represented by Europe, which counts for a cumulative issuance in its territory of 750 billion USD; and the U.S., with a total amounting to USD 303 billion³⁴.

Sustainability-linked bonds on the other hand were also able to strengthen their position, with a total issuance for the first quarter of 2023 of USD 22 billion. Although this measure is quite below the amounts for the two previous years, this robust start may mark the potential return to a growing issuance.

Sustainability bonds in the meanwhile tend to record an average issuance of US 40 billion, during the first quarter of 2023, in line with quarterly averages met in 2022.

A summary on the composition of the sustainable bonds' totals can be viewed in the next graph³⁵, emphasizing the dominant contribution of the green market to the overall amounts.



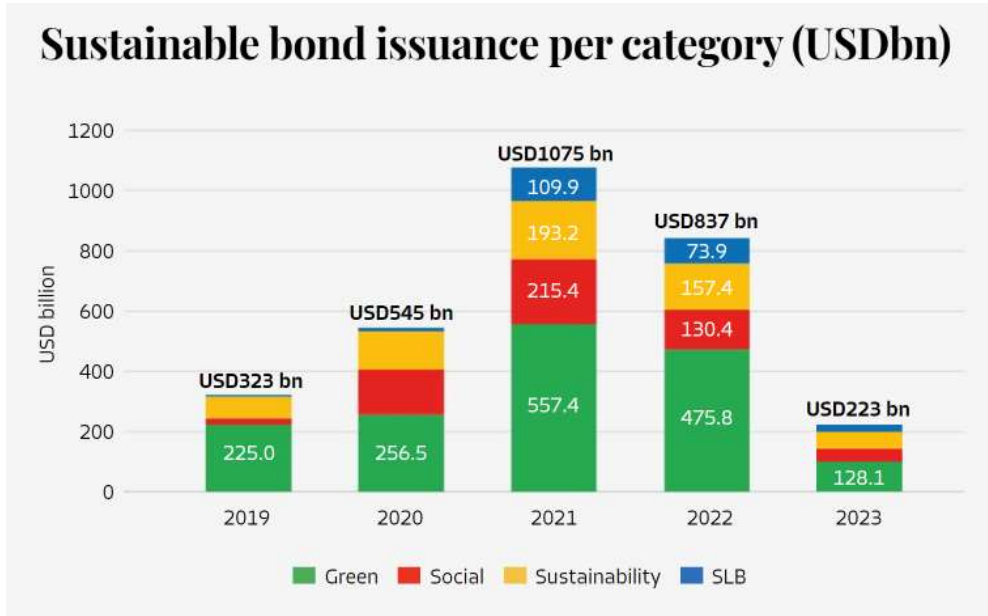
Having provided an overview of the main instruments characterizing the sustainable financial environment and the latest trends that characterize it, at this point we can affirm that green bonds currently dominate the sustainable market with a cumulative issuance, as of March 2023, of more than \$1.6 trillion. Sustainability-linked bonds, on the other hand, should not be underappreciated, since, although having had some difficulties over the last two years, the current situation seems to allow for a potential growth -almost- comparable with the 2021 levels.

³³ This achievement was also supported by a strong issuance of sovereign sustainable bonds at the beginning of the year. Source: Environmental Finance.

³⁴ Source: Statista (2022).

³⁵ Source: Environmental Finance.

The up-to-date framework characterizing cumulative amounts of sustainable bonds is shown by the graph³⁶ below.



³⁶ Some minor differences in the amounts presented with respect to previous data are due to either different inclusion of green projects, or because different periods are comprehended in the analysis. Source: ICMA Based on Bloomberg Data – as of 2023.

2. Markets With a Potential to Green the Economy

2.1. The Potential of the Green Bond Market Compared to the One of the Sustainability-Linked Bond Market

Keeping in mind that the final goal of the issuance of sustainable instruments is that of greening the economy, to make a direct comparison between green and sustainability-linked bond markets' potential to do so, we should focus on some key points. Among these, we consider the market development and forecasts for each of the two instruments; the state of reporting for green and sustainability-linked bonds; and the establishment across countries and currencies of the two instruments.

For what concerns market development, after the peak of issuances reached in 2021, the adverse macroeconomic conditions³⁷ of the past year have led to a decline in sustainable bond issuance, but forecasts for 2023 show a potential total issuance that could reach between USD 900 billion and USD 1 trillion³⁸. As it emerges from the data presented in the previous section, recent trends in markets for sustainable bonds have suggested a dominant position of green bonds, as compared to all other sustainability related instruments; particularly, comparing green bonds' issuance volumes with sustainability-linked bond ones for most recent years³⁹, it appears that the average relative volume of the latter in terms of the former, only counts for slightly more than 17%. This situation is predicted to be maintained in the near future⁴⁰, in the sense that green bonds should be able to keep their leading position. Another element that might suggest that green bonds will continue to set the pace, at least in a short-term period, can be found by looking at the changes that occurred in market composition during recent years: considering the 2021-2022 period data, it can be easily demonstrated that green bond issuances have decreased less than any other sustainable bond type for the same timeframe⁴¹. Considering that these last two years have represented challenging periods due to adverse external factors, the resilience of green bonds could be a signal of strength even under complex market conditions.

³⁷ Mainly referring to the cost-of-living crisis, tightening financial conditions in most regions, Russia's invasion of Ukraine, and the COVID-19 pandemic all weigh on the economic landscape.

³⁸ A forecast on market trends for 2023 has been provided by S&P Global. See [Sustainable bond issuance will return to growth in 2023 | S&P Global \(spglobal.com\)](https://www.spglobal.com/sustainability/insights/2023/01/23/sustainable-bond-issuance-will-return-to-growth-in-2023).

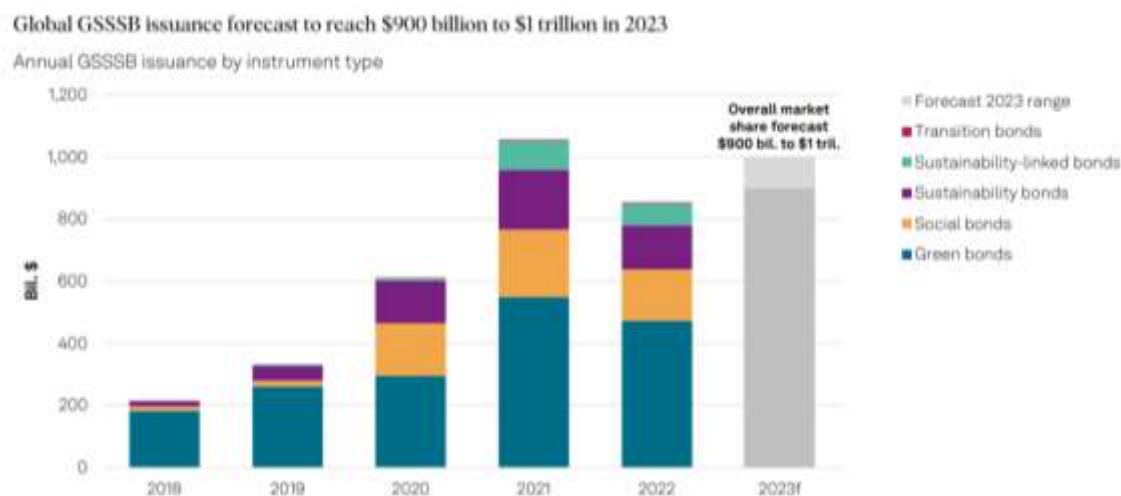
³⁹ Specifically, 2021 and 2022.

⁴⁰ See supra note 38.

⁴¹ Referring to the graph 'Sustainable Bond Issuance per Category (USDbn)', the change in the market composition is characterized by a decrease in the amount of green bonds issued in 2022 of less than 15%, respect to the 32.75% decrease of SLBs, and -18.5% of sustainability bonds, respect to 2021.

On the other hand, sustainability-linked bonds appear to be at an inflection point: data on the first quarter of 2023 on SLBs suggest us to adopt an optimistic attitude when discussing SLBs’ role in the future, thus underlying that their potential growth is very large⁴², but issuers of these securities should address the increasing lack of credibility that might lead investors in doubting the commitment of SLBs issuers⁴³. Considering the youth of the instrument, and the timing coincidence with the emergence of challenging external factors, the negative growth trend of the last years is yet to be clearly attributed to a precise cause: if on one hand investors doubt issuers’ commitment towards the green purpose, the difficulties experienced by SLBs issuers in the recent years should not be underestimated⁴⁴, as these might have led to great complications in achieving the predetermined targets.

Overall, the discussion can be summarized by stating that the sustainable market as a whole is expected to grow in 2023 with a potential target reaching the USD 1 trillion, as the graph⁴⁵ below shows, and current market data seem to run in favour of green bonds.



⁴² Potential growth associated to SLBs is due to their flexibility in proceeds use, that allows access to the sustainable world to a broader base of issuers. Recent events, mainly the Russia-Ukraine war, are a reminder that countries depend heavily on fossil fuels, indicating difficulties in achieving decarbonization goals. Greater flexibility paves the way for some traditional energy companies to participate in the transition to net-zero. These companies should demonstrate their efforts to reduce carbon emissions. Thus, the sustainability-linked bond market represents an important opportunity for financing emissions reduction.

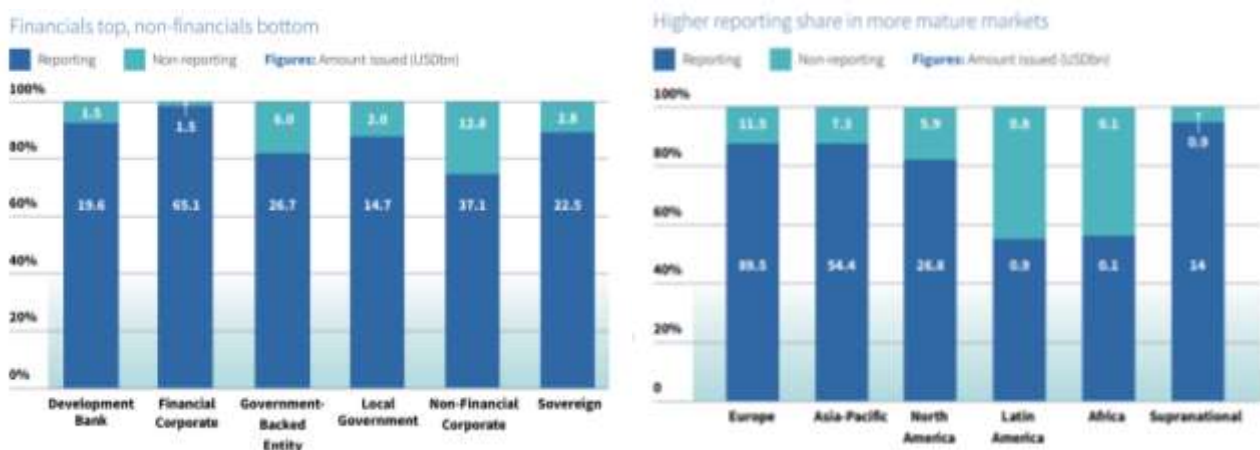
⁴³ Esma, the financial sector regulator for the EU, argued that issuers could consider SLBs a “free lunch;” this is emphasized by the widespread use of call options, which allow issuers to recall a SLB before a target is reached. See [Sustainability bond market stumbles as investors get picky | Financial Times \(ft.com\)](https://www.ft.com/content/2022-11-16/sustainability-bond-market-stumbles-as-investors-get-picky).

⁴⁴ 90% of SLB issuers are represented by non-financial corporates, and these were particularly affected by the challenging market conditions discussed. See S&P Global, SUSTAINABILITY INSIGHTS RESEARCH, *Sustainable Bond Issuance Will Return to Growth in 2023* (2023).

⁴⁵ The graph comprehends all GSSS bond issuance. Source: S&P Global Ratings, Sustainability Insights. (2022)

The importance of current state of reporting⁴⁶ is strongly tied to the future development of the sustainable bond market, as it represents a signal of issuers' transparency. In fact, the reporting activity is essential to track the investments funded through the issuance of sustainable bonds, and thus encourage credibility of issuers from the investors' point of view. The problem of lower degree of reporting for what concerns sustainable bonds, compared to traditional ones, is attributed to the lack of strict frameworks to be adopted when issuing green, or, in general sustainable bonds.

It can be said that larger issuers are those most likely to report, and reporting availability is positively correlated with deal size⁴⁷. The current state of sustainable reporting can be viewed in the graphs⁴⁸ reported below, emphasizing how in markets that are more sustainably developed a higher degree of reporting is registered, and, moreover, reporting seems to be more popular among financial, rather than non-financial, issuing institutions.



Despite the lower numbers associated with sustainable reporting, entities reporting on sustainable debt seem to be increasing in amount over time, and use of proceeds reporting appears to be higher in amount than impact reporting⁴⁹: while both are associated with green bonds, the fact that the use of proceeds reporting is more popular than the latter might signal an advantage for use of proceeds bonds. This can be deduced from the fact that other types of sustainable bonds, in particular the sustainability-linked ones, rely exclusively on reporting the impact they have on the environment,

⁴⁶ Data on the state of reporting are based on Climate Bonds Initiative assessment. See CLIMATE BONDS INITIATIVE, *Post Issuance Reporting in the Green Bond Market* (2021).

⁴⁷ See supra note 46.

⁴⁸ Source: Climate Bond Initiative.

⁴⁹ Use of proceeds (UoP) reporting refers to the reporting of projects funded with the proceeds raised by the issuance of use of proceeds bonds (e.g., green bonds); impact reporting, instead, consists in reporting the environmental impacts achieved through the projects.

since they are not specifically tied to precise projects, and thus a use of proceeds reporting cannot be provided. In this sense, green bonds might have an advantage in credibility respect to sustainability-linked ones.

Table 2⁵⁰: Use of Proceeds Reporting is More Common than Impacts.

	Reporting Scope			
	UoP	Impact	Both	At least One
Number of Issuers (Reporting %)	77%	59%	57%	79%
Number of Bonds (Reporting %)	77%	63%	62%	78%
Amount Issued (Reporting %)	88%	74%	73%	88%

In general, it can be said, to confirm the argument on the importance of available and clear reporting for promoting sustainable investments, that ESG investing’s real problem is the lack of data from investors’ behalf⁵¹: as both green bonds and sustainability-linked bonds represent a crucial component for ESG investing, in determining which of the two will be more likely to succeed an advantage could be held by that instrument most able to satisfy investor’s need for transparency⁵².

For what concerns the analysis of the establishment of the two instruments across countries and currencies, it is reminded, as already largely discussed in the previous chapter, that green investing in its general form, especially in most recent years, has been experiencing higher growth rates over time and across countries, as summarized by the graph⁵³ below.

⁵⁰ The amount issued is measured in USD billions. Source: Climate Bond Initiative

⁵¹ A survey conducted by analytics firm Coalition Greenwich shows that of 111 senior buy-side fixed-income investors 90% are sensitive towards their investments’ impact on ESG matters, yet only about a third of investors have fully integrated ESG into their risk-analysis. The reason seems to be attributable to the lack of data. See [ESG’s real problem is a lack of data, fixed-income pros say | Insights | Bloomberg Professional Services](#).

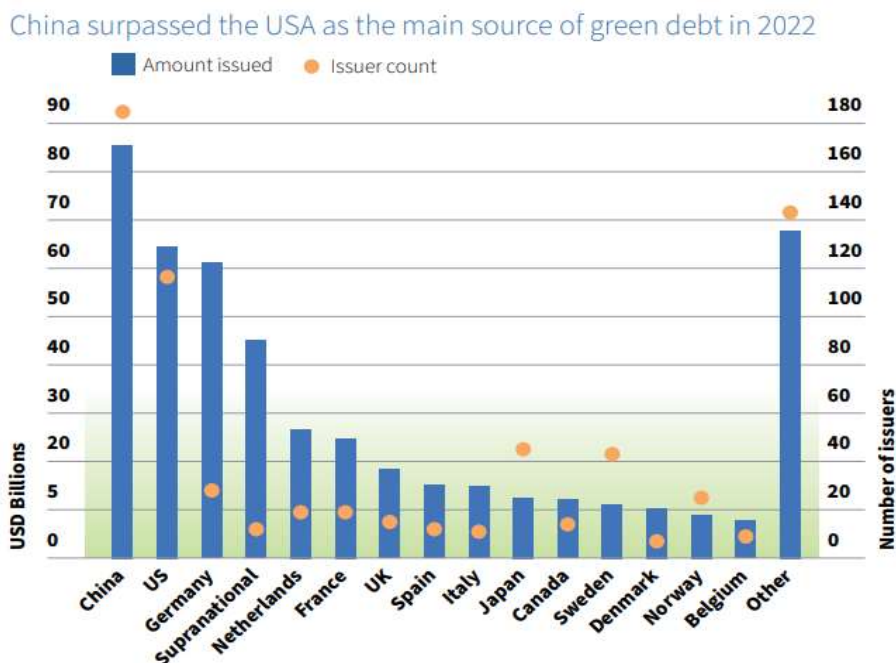
⁵² Climate Bonds’ expansion of its [Standard and Certification Scheme to SLBs](#) in early 2023 might positively affect rigour in the market for SLBs. These efforts will signal to investors SLBs that meet best practice against an internationally recognised standard. See [2022 Market Snapshot: And 5 big directions for sustainable finance in 2023 | Climate Bonds Initiative](#).

⁵³The EO Index stands for the Environmental Opportunities Index. Source: FTSE Russell (2022).



As green investing is promoted through the use of both green and sustainability-linked bonds, we shall focus primarily on the former, and subsequently on the latter⁵⁴.

Development of green bonds across countries has showed a leading position of issuance volumes in Europe, United States and China. Particularly China was able to surpass the US as primary source of green debt in 2022, and many European Member States committed portion of their fiscal spending to accelerate the transition to a low carbon economy through the promoting of green bonds: Germany, in this respect, retains a leading position⁵⁵. The graph⁵⁶ provided below summarizes this situation.



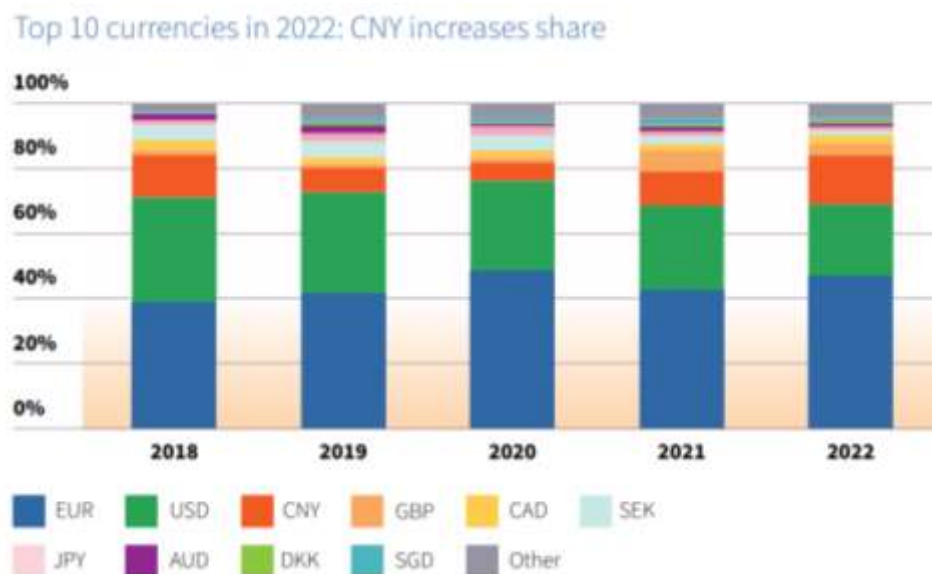
⁵⁴ This thesis focuses on the analysis of green and sustainability-linked bonds, so a comparison of exclusively these two green instruments' establishment across countries and currencies, shall be provided, ignoring other GSS+ instruments.

⁵⁵ Analysis of this section relies on data provided by Climate Bonds Initiative. See CLIMATE BONDS INITIATIVE, *Sustainable Debt Global State of The Market 2022*. (2022)

⁵⁶ Source: Climate Bond Initiative. (2022)

The geographical contribution to the green bond market counts for more than two thirds of green bond volume originating from developed markets, about 23% from emerging markets, and 9% from supranationals⁵⁷. It is interesting to note that while in 2022 both developed and emerging markets have recorded a reduction in the volume of issuances respect to the prior year, caused by the adverse conditions affecting financial markets, supranational entities have instead increased their issued amount of green bonds by more than 43%. This growth was mainly driven by the European Union that promoted an extensive green bond program through the implementation of the NextGenerationEU recovery plan⁵⁸ as a response to the COVID-19 pandemic emergency.

Referring to currencies, as of 2022 hard currencies were the source of 79% of green bond issuance⁵⁹. Among the thirty-three currencies in which green bonds are issued, the EUR was the preferred one in the fifth year in a row: being Europe the source of the most advanced policy measures and largest number of dedicated investment mandates, it is not surprising that the region has dominated green bond issuance, as illustrated by the graph⁶⁰ below.



Turning the analysis to sustainability-linked bonds’ geographical extension, as of 2022 Italy and France maintained their leading position as main issuer countries for these instruments, with the

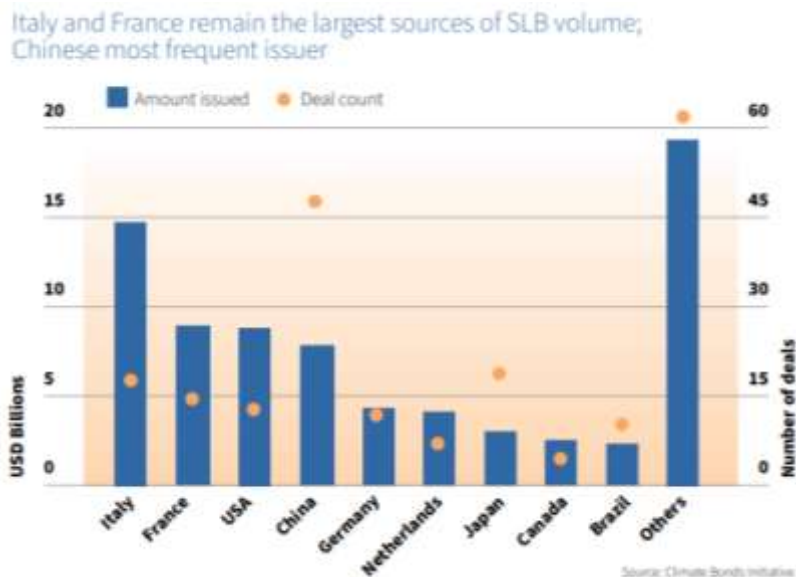
⁵⁷ Developed markets comprehend Europe and USA; emerging markets are represented by Asian countries, such as China; and supranationals comprise those states that transcend boundaries to share a decision, such as the European Union.

⁵⁸ This recovery plan represents a temporary facility that requires that more than 30% of funds allocated to member states must be used to finance the environmental transition.

⁵⁹ Hard currencies refer to currencies issued by a politically and economically stable country.

⁶⁰ Source: Climate Bonds Initiative (2022).

Italian company Enel alone making up for 86% of Italian SLB debt in the year. In terms of volumes China was ranked as the fourth country, with an average size of issued SLBs of USD 195.2 million; nevertheless, it appears to be the most frequent issuer of these innovative instruments. The graph⁶¹ below provides a snapshot of the presented data⁶².



Focusing on currencies, the EUR denominated SLBs continued to dominate in 2022 reaching 39% of total volumes. Moreover, 17% of these issuers are made of those based outside the eurozone trying to attract the EUR-focused sustainable investors. The USD remained the prevailing currency for those issuers choosing a foreign currency in which to issue sustainability-linked bonds. On the other hand, the CNY and JPY were the fastest growing currencies for these instruments during 2022: this growth was supported by transition programs promoted by local entities and governments. In opposition with green bonds, sustainability-linked bonds' share of hard versus soft currency seems to tilt towards the latter, as the growth of local currency deals allowed for 70% of issuances to be denominated in home currencies. The graph⁶³ presented below presents the stated situation.

⁶¹ Source: Climate Bonds Initiative (2022).

⁶² This analysis is the result of the study of data provided by the Climate Bonds Initiative. See supra note 55.

⁶³ The term 'others' includes 15 currencies, of which CHF, COP, and NZD saw their first SLBs in 2022. Source: Climate Bond Initiative (2022).



As both green and sustainability-linked bonds have been able to establish themselves across international markets, there appears not to be, in this respect, some crucial element that would favour the future further geographical development of one, rather than the other, instrument. However, as it might have been noticed, there have been mentioned different features characterizing issuers of green respect to sustainability-linked bonds. A further development on the topic shall be provided in the following section.

2.1.1. Issuers' Characteristics

When conducting a comparative analysis between green and sustainability-linked bonds differences related to issuing entities emerge, and in order to avoid comparing incongruent results they should be further analysed. In fact, while sustainability-linked bonds have been first conceived and further developed by the non-financial corporation Enel, and have been popular among non-financial entities, green bonds appear to have a more established level of diversification for their range of issuers.

Keeping this broad distinction in mind, we shall focus on developing an analysis of issuer's characteristics for each of the two instruments.

Green bonds were first issued by the supranational entity European Investment Bank, that still maintains its second place in the top three issuers⁶⁴: the first and third place are represented, respectively, by the European Union and the Federal Republic of Germany. On the other hand, the three most frequent issuers appear to be Ginnie Mae, Fannie Mae, and Deutsche Bank⁶⁵. This first identification of top issuers allows us to appreciate a diversified scenario, which counts for the presence of sovereign, development bank and government backed entity issuers. As of 2022, the corporate sector managed to count for slightly more than half of green bond issuances, namely 54% of total, and, particularly, a larger amount was issued by the financial corporate sector⁶⁶ and a smaller one by non-financial corporate issuers⁶⁷. Slightly under a fifth of issues came from government backed entities, which represented the only sector that recorded an increase respect to previous year issuance of 6%⁶⁸.

As green bonds are characterized by a wide range of issuers, a summary is provided by the graph⁶⁹ below.



The scenario characterizing sustainability-linked bonds is quite different. The private sector largely dominates issues of these instruments, and particularly non-financial corporates count for slightly less than 80% of total issuance. The largest of these issuers continues to be Enel, immediately

⁶⁴ In terms of cumulative issuance.

⁶⁵ Ginnie Mae is a government national mortgage association (US); Fannie Mae is a federal government national mortgage association (US). Source of data for this section: Climate Bonds Initiative.

⁶⁶ Particularly, 29%.

⁶⁷ Particularly, 25%.

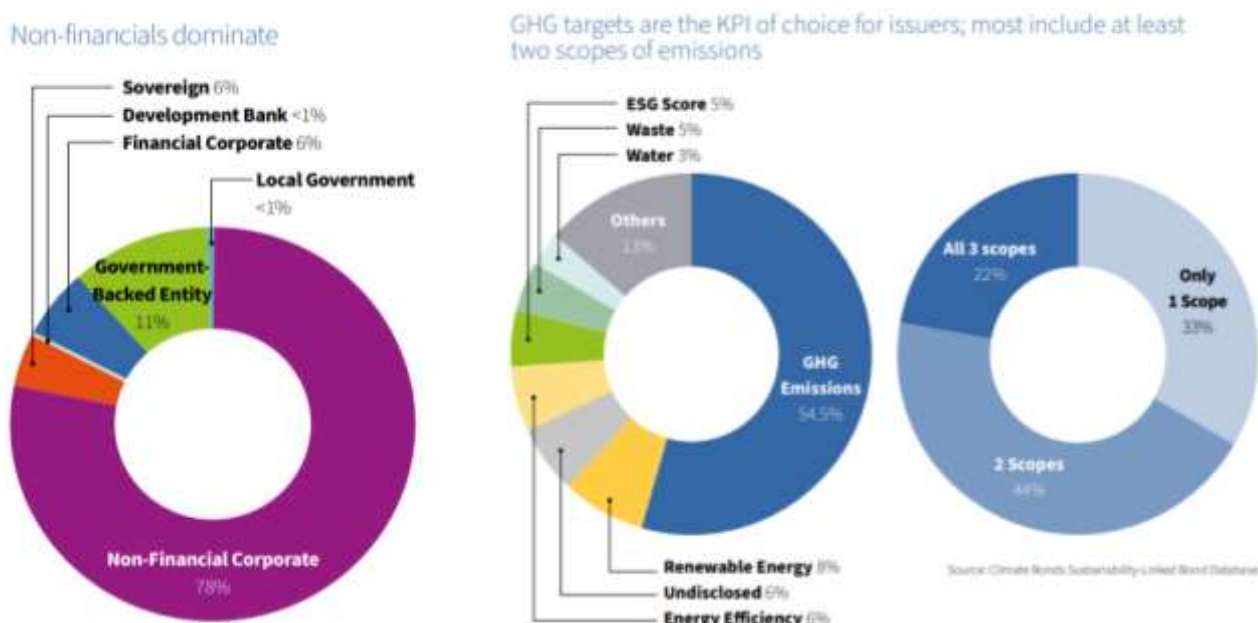
⁶⁸ Growth in this segment was driven by EU.

⁶⁹ The graph shows the shares held by green bond issuers in percentage for 2022. However, it is worth to be noted that overall number of issuers decreased over 2022 respect to the previous year. Source: Climate Bonds Initiative (2022).

followed by the Dutch company VodafoneZiggo. In 2022 financial corporates maintained about 6% of the issuers' share, but the most important news of the year was the first issuance of sovereign and local sustainability-linked bonds, the former issued by the Republic of Chile⁷⁰, and the latter from Swedish City of Helsingborg⁷¹.

Data on issuance of sustainability-linked instruments show that most issuers tend to choose greenhouse gas emission targets (GHG), with more than half of them including also a decarbonization target⁷².

The state of type of issuers' share and choices referring to targets are presented by the graphs⁷³ below.



A subtle, yet relevant, distinction between issuers of green bonds respect to sustainability-linked ones is shown in their preference respect to short and long-term debt issuance. In fact, as the former have demonstrated a strong prevalence of short-term green bond issued, the latter show an

⁷⁰ Followed by Uruguay. Their size is worth USD2bn and USD1.5bn, respectively. Both tie their debt to GHG reduction targets and secondary KPIs and targets: a precedent has been set for future sovereign SLB deals to serve as transition finance instruments. Data Source: Climate Bonds Initiative.

⁷¹ The target is to reduce its emission levels by 61% by 2024 (against a 1990 baseline). This first local issuance was also followed by Arizona Industrial Development Authority (USD200m) and Japanese Shiga Prefecture (JPY 5 billion, and USD 38.4 million).

⁷² Among sustainability-linked bonds attached to precise emission targets, 67% covered all direct emissions of issuers, demonstrating their commitments towards transition activities to improve decarbonization. However, the materiality of all three scopes varies across sectors.

⁷³ Source: Climate Bonds Initiative (2022).

increasing trend towards long-term date choices, which might signal stronger commitment in towards the green transition. The graphs⁷⁴ below illustrate this argument.



Having clear these distinctions that characterize the two sustainable bond markets, from this comparative analysis what appears to be the main difference across issuers of the two instruments is that green bonds result to be more established across several types of issuers, in the sense that larger shares of different issuers hold green bonds respect to shares characterizing sustainability linked ones. These, in fact, appear to be principally held by non-financial corporations, and only in smaller parts by other entities.

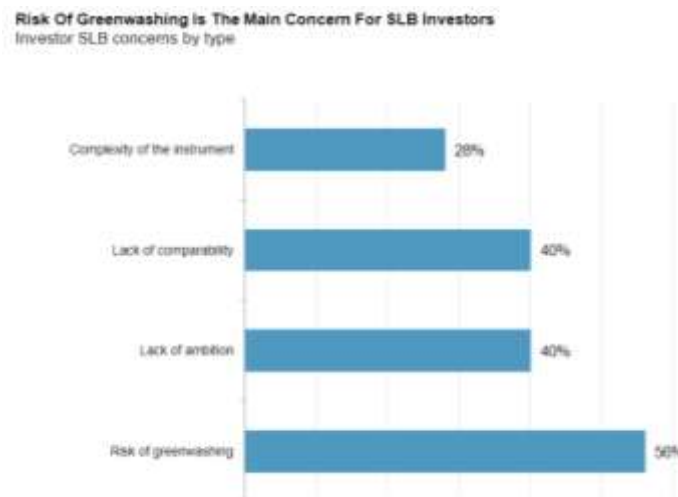
Of course, the fact that there exists a great time difference between the first introduction of the two instruments has allowed green bonds, issued first, to fully develop and gain acceptance over time by all market participants. Sustainability-linked bonds, as having been first issued only in 2019, on the other hand, still need time to reach the same establishment level in the market. Surely the recent expansion towards sovereign sustainability-linked bonds will benefit the instrument's development in the future, although a true turning point will emerge once that the main developed countries⁷⁵ will adopt the same practice.

⁷⁴ The graph on the left illustrates the strong prevalence of short-term green bonds; the one on the right signals a growth of long-term SLB issuance. Source: Climate Bond Initiative (2022).

⁷⁵ Particularly USA, EU, and China.

2.1.2. Main Challenges for Green and Sustainability-Linked Bonds

Challenges faced by green and sustainability-linked bonds mainly arise because of the general problem of lack of credibility attached to sustainable investments. In particular, the lack of transparency in reporting, from issuers' behalf, rises investors' concern towards the practice of greenwashing. A measurement of investors' concerns can be viewed in the chart⁷⁶ provided below.



In fact, as the market sustainable bonds is expanding rapidly, to reach the net zero target by the middle of the century it is necessary to issue a total amount of USD 5 trillion in green bonds per year, starting from 2025⁷⁷. This pressure that is put on issuers to promote rapid sustainable expansion worries both regulators and investors as they fear for greenwashing activities: greenwashing refers to the practice of channelling the proceeds raised through the issuance of sustainable bonds towards projects that have no, or worse, negative environmental impacts.

Concrete measures to solve this issue require changes in several fields: clearer definition of standards, stricter reporting rules, and actions to be taken in case of default, should all be specified to give rise to an actual addressing of the matter⁷⁸. In this respect, the choice made by the European Union and China to approve their own green taxonomy⁷⁹ seems a wise step, as many jurisdictions

⁷⁶ Data is based on a survey of 40 global investment managers managing \$20 trillion in assets, including 31 in Europe and 9 in America. Source: S&P GLOBAL, Natixis.

⁷⁷ Estimate made by Climate Bonds Initiative.

⁷⁸ These were found to be the main fields to start the addressing of the matter and promote the road to transparency. See Freire Henrique Sousa, SSRN, *GREEN BONDS: The Road to Transparency* (2022).

⁷⁹ The term taxonomy reflects the process of identifying and classifying certain matters according to their similarities. A taxonomy is meant to promote both clarity and guidance to financial market participants on which activities are eligible as sustainable investments. The European taxonomy is being developed in several stages: the overarching taxonomy regulation was approved in 2021 and the Climate Delegated Act. The Chinese green taxonomy was first issued in 2015

are expected to follow. In fact, taxonomies appear to be useful in preventing greenwashing as they embody three main features⁸⁰:

- They are granular: taxonomies provide detailed information on what projects are eligible as green or sustainable.
- They are publicly available: taxonomies are publicly available and not based on proprietary methodologies; so that they can be accepted and understood by most participants.
- They are science based: as far as possible, taxonomies are based on scientific studies rather than national, or public, opinions.

Despite the progress made by these jurisdictions in increasing the level of standardization of ESG investing, the road to global standardization appears to be relatively long, as there is still a too high degree of fragmentation across many countries' regulations and taxonomies⁸¹.

A double challenge, thus, emerges: the general development of taxonomies across the globe, and a level of global harmonization to be achieved and maintained. As both the matters will be addressed, and, thus, global standards evolve, entities are predicted to increase accountability for their sustainable commitments, since both investors and regulators will increase scrutiny on sustainable investments. The effects of these changes may eventually be reflected by capital markets by potentially limiting access and/or increasing the cost of capital for those issuers that are unable to deliver their sustainability goals⁸².

Considering the actions already taken to improve global standards and the future ones predicted to come, it is possible to state that markets are aware of investors' increasing concern towards the practice of greenwashing and are acting to try to address it. Even though all world markets will eventually be able to do so, it is also true that different countries might arrive to the finish line before others, and thus it is not improbable that sustainable market imbalances across countries, in terms of development, will continue to be maintained for the near future.

and has been updated in 2021 to meet global definitions. This taxonomy focuses on climate change, environmental improvement, circular economy, waste recycling and pollution prevention.

⁸⁰ This classification is promoted by Climate Bonds Initiative. See CLIMATE BONDS INITIATIVE, *Sustainable Debt Global State of the Market 2021*. (2021)

⁸¹ See S&P GLOBAL, *The Fear of Greenwashing May Be Greater Than the Reality Across the Global Financial Markets* (2021).

⁸² See supra note 80.

2.1.2.1. How Blockchain Can Help

The use of Distributed Ledger Technology (DLT) has been common practice in the financial sector for some time now, since capital markets are facing a blockchain⁸³, Artificial Intelligence (AI), and Internet of Things (IoT) driven revolution. DLT technology has been promoted by financial institutions with the aim to reduce operational costs and risks, and to improve efficiency in capital markets.

Although blockchain technology is still in its early stages, the effectiveness of DLT seem to be favourable for bond markets, since it reduces issuance costs, lowers the number of intermediaries needed, cuts the length of the settlement process, and improves reporting transparency⁸⁴.

Blockchain applied to sustainable bonds concerns mainly three areas⁸⁵:

- Structuring, issuance, and distribution.
- Transfer of ownership, payment, and settlement.
- Benchmarking and reporting.

The two former points focus on cost efficiency, while the latter on the matter of credibility, directly connected with the prior discussion on challenges faced by sustainable bonds.

Respect to credibility, a revolutionary approach known as automated investing of green data, would allow data on sustainable projects to flow in real time to investors: the IoT devices would be constantly measuring the environmental impact, and by transforming the information in data tokens, this would be incorporated within the ledger and reach investors⁸⁶.

As for what concerns cost efficiency, blockchain technology operates through several areas, such as a reduction in the actors needed in the bond's issuance process, immediacy of distribution, and efficiency in settlement. To give an idea of the reduction in costs when sustainable bonds are issued using blockchain technology, the following comparison⁸⁷ is proposed.

⁸³ Blockchain works using a database that stores data of all transactions that have occurred in a peer-to-peer network; blockchains are practically unchangeable once transactions are recorded, since every network has a duplicate of the ledger.

⁸⁴ See Pana Elisabeta, Gangal Vikas, JOURNAL OF APPLIED BUSINESS AND ECONOMICS *Blockchain Bond Issuance* (2021).

⁸⁵ The classification is proposed by the report on blockchain as gateway for sustainability linked bonds. See Haarr Marianne, HSBC and SUSTAINABLE DIGITAL FINANCE ALLIANCE, *Blockchain: Gateway for Sustainability linked Bonds* (2019).

⁸⁶ This approach is proposed by the report on blockchain as a gateway for sustainability linked bonds. See supra note 85.

⁸⁷ The comparison provides the calculated price difference estimates for standard issuances versus a full blockchain automated issuance for a typical Green Bond with value of 100 million USD and 20-year maturity. See Haarr Marianne, HSBC and SUSTAINABLE DIGITAL FINANCE ALLIANCE, *Blockchain: Gateway for Sustainability linked Bonds* (2019).

Standard vs Blockchain Cost Estimates Comparison Table

GREEN BOND PROCESS (USD)	STANDARD PROCESS	WITH FULL BLOCKCHAIN AUTOMATION
Structuring, price setting, risk rating	1,000,000	20,000
Legal review	100,000	40,000
Investor whitelisting and matchmaking	500,000	n/a
Internal review and green classification	50,000	20,000
Third party validation and green benchmarking	50,000	5,000
Registration and listing	15,000	n/a (if sold on blockchain exchange)
Brokerage and sales	1,500,000	40,000
Payment and settlement	Opportunity cost: 84,000	0
Custodianship	350,000	2,000 (blockchain dependent)
Data gathering (full lifecycle)	1,200,000	350,000 (includes IoT devices)
Data aggregation (full lifecycle)	400,000	115,000
Reporting (full lifecycle)	1,200,000	100,000
Total	6,449,000	692,000

Having presented the two main areas through which blockchain can operate, it appears evident that this type of innovative approach would accelerate the development of the sustainable bond market. On one hand, it would enrich the relationship between the investors and the issuer, by granting access to full information and enhancing transparency; and, at the same time, as the issuance of bonds is considerably expensive, blockchain, by reducing costs, could allow for the inclusion more entities into the issuance of sustainable bonds, and, thus, furtherly promote the development of the whole sustainable market⁸⁸.

⁸⁸ The first blockchain green bond was issued in February 2019 by BBVA; the DLT was used to promote more efficient negotiations of the terms and conditions, since in this case the issuance dealt with a private placement, in which MAPFRE invested €35 million in the six-year term bond linked to the evolution of the five-year swap rate. This issuance, supported by blockchain technology, promoted the commitment of the BBVA Group towards the sustainable impact of its investment. First publicly offered digital green bonds were issued by the Japan Exchange Group (JPX), parent corporation of the Tokyo Stock Exchange; this decision was triggered by the fact that green bonds were seen as an asset class that lacked trust, both due to inefficient data collection and poor traceability. Deals of both types are considered as particularly ground-breaking, since their nature promotes both sustainability and high-tech development in financial markets.

2.2. The Cost of Green Financing

As green and sustainability-linked instruments embody fixed income debt securities, the cost of financing from issuers' behalf consists in the interest rate paid to investors on the borrowed amount of capital. Since this analysis is focused on sustainable bonds, we aim at understanding whether there exists a lower cost of financing for entities issuing these securities, compared to traditional ones. In such case, we speak of the greenium: the existence of a negative difference between the interest rate paid on sustainable and brown bonds⁸⁹.

To assess whether the greenium does exist, an analysis on the state of demand and supply for sustainable bonds should be provided: as an excess demand would imply higher prices and lower interest rates, we aim to find oversubscription for both green and sustainability-linked debt securities.

Considering 2022 data, green bonds in both EUR and USD have attracted larger number of investors, reaching impressive levels of oversubscription: for the EUR average oversubscription was 3.6 times for green bonds, versus 3.0 times for vanilla ones; considering USD average oversubscription was 5 times for green bonds and only 3 times for vanilla equivalents⁹⁰. The tables⁹¹ below summarize these results.

EUR Book cover				
Category	Green bond sample	Number of green bonds beating vanilla basket	Green average book cover	Vanilla basket average book cover
SSA	10	7	2.9	2.5
Covered	6	5	3.2	1.7
A	10	5	2.8	2.3
BBB	24	12	4.3	3.9
Total	50	29.0	3.6	3.0

USD Book cover				
Category	Green bond sample	Number of green bonds beating vanilla basket	Green average book cover	Vanilla basket average book cover
SSA	1	1	3.8	1.6
A	10	8	6.1	3.3
BBB	5	2	2.8	3.2
Total	16	11.0	4.9	3.0

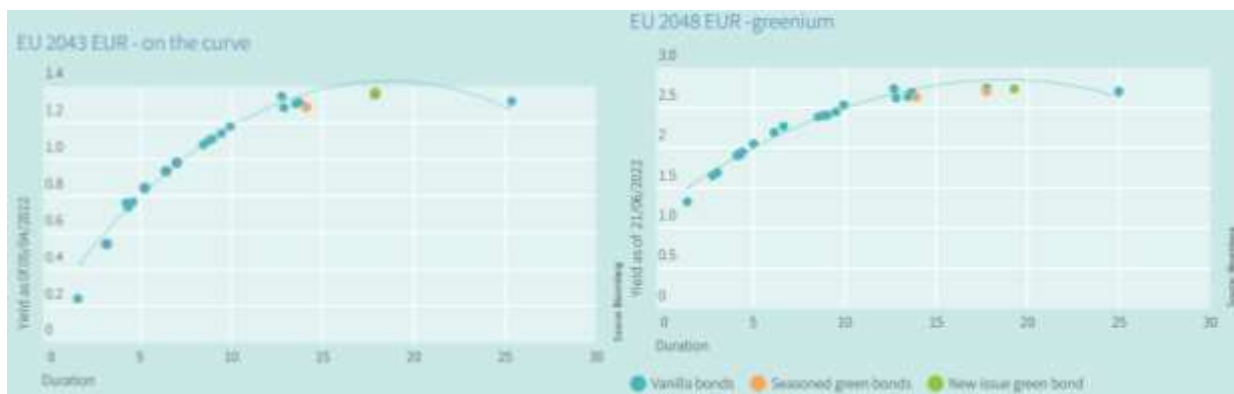
⁸⁹ The term *brown* or *vanilla* is often used to describe non green, plain, securities. Throughout this thesis, this interpretation should be adopted by the reader.

⁹⁰ Source: Climate Bonds Initiative. See CLIMATE BONDS INITIATIVE, *Green Bond Pricing in the Primary Market* (2022).

⁹¹ Source: Climate Bonds Initiative. (2022)

As timing represents an important factor in security issuances⁹², it is noteworthy that increasing investors' demand for these bonds seven and twenty-eight days after issuance led to a tightening of 59% of them in the first period and 55% in the second, respect to a vanilla basket⁹³.

The oversubscription levels presented, as predicted, suggest for the existence of the greenium, that can be noted across all categories of sustainable bonds. On a graph the existence of the greenium can be observed by the fact that the sustainable bonds yields will sit inside the yield curve for vanillas: this is the case for European issuance of green bonds, as presented in the graphs⁹⁴ below.



In fact, the European Union, after announcing its NextGenerationEU programme, since its first issuance in October 2021 had experienced bids for more than twice the amount of the bonds, reaching a x13 times covered transaction in May 2022. Thanks to this success, the EU is expected to become the largest green bond issuer worldwide.

The study to test the existence of the greenium also applies to sustainability-linked bond instruments; in fact, as in the analysis related to the European green bonds, we select the major issuers of sustainability-linked bonds, and plotting their vanilla yield curve against the sustainable yields we obtain similar results.

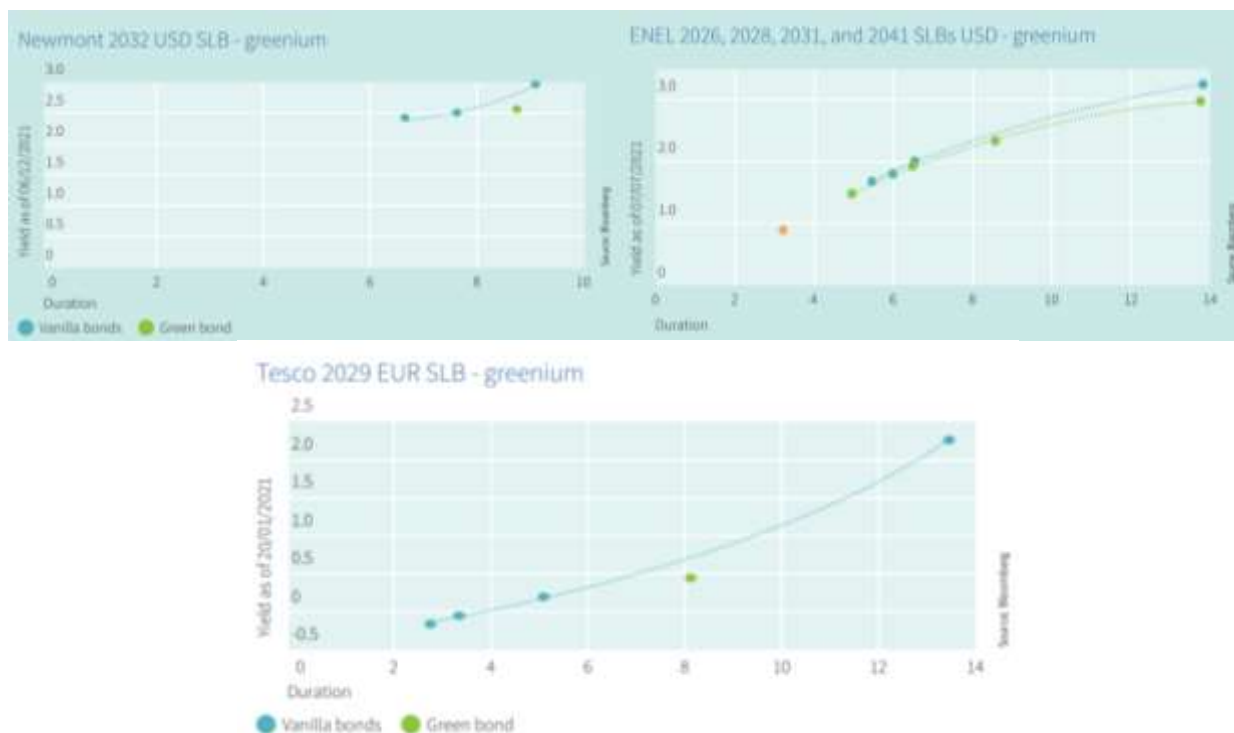
In particular, we analyse sustainability-linked yields for TESCO 2029 EUR SLBs; Newmont 2032 USD SLBs; and Enel 2026, 2028, 2031, 2041 USD SLBs through the graphs⁹⁵ below.

⁹² Investors may decide to increase their position or open a position in a bond that didn't get allocated. This allows for changes in prices of bonds after their issuance.

⁹³ See supra note 90.

⁹⁴ Source: Climate Bonds Initiative. (2022)

⁹⁵ Source: Climate Bonds Initiative. (2022)



The result that is immediately viewed graphically is the existence of a lower yield, and so cost of financing, for sustainability-linked bonds, just as in the case of green bond issuances.

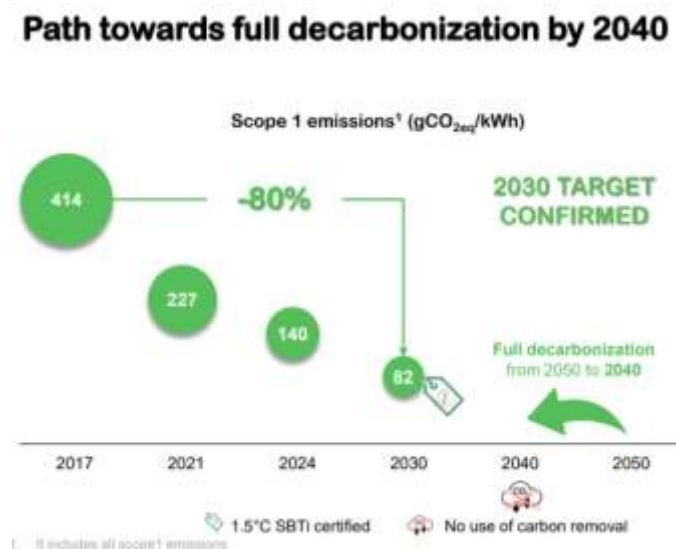
The overall results of the discussion on the cost of green financing make us adopt an optimistic attitude when thinking about the development of the sustainable bond market, as issuers that might be attracted by lower yields could be encouraged to increase their effort towards entailing sustainable practices. Also, as the greenium is observed both in green and sustainability-linked bond markets, issuers aren't expected to prefer either instrument on the basis of its cost of financing, but, rather, they should focus on understanding which better instrument suits their sustainable needs and promote its use.

3. Enel's Sustainable Evolution

3.1. From Green to Sustainability Linked Bonds

Enel, the Italian national entity for electricity, has always embodied a pioneer in the sustainable market: in 2004 it became the first private company in the renewable power sector to be listed on the Dow Jones Sustainability Index, in 2008 it already created the group Enel Green Power, and in 2019 it was the first company in the world to launch a sustainability-linked bond⁹⁶.

In fact, Enel operates with a clear path in mind: a reduction in total CO₂ emissions by 2030, and full decarbonization by 2040⁹⁷. The graph⁹⁸ below shows the evolution process that the company is aiming at achieving since 2017.



The path seems ambitious, but Enel's view on sustainable finance allows for a clear structuring of the sources of sustainable growth. In particular, Enel relies on a combination of private and public capital, in the former case raised through the issuance of sustainability-linked bonds, and in the latter obtained through grants and subsidized loans⁹⁹.

⁹⁶ See [Our history | Enel Group](#).

⁹⁷ In particular, the process aims at deploying new Renewable Energy Sources (RES) capacity to have 100% RES fleet by 2040; exit from coal by 2027; exit from gas by 2040; exit from gas retail by 2040; 100% of sales from RES; and full CAPEX plan aligned with 2040 net zero targets.

⁹⁸ Source: Bloomberg (2022).

⁹⁹ As Enel is an Italian company, it is currently benefiting from the NextGenerationEU plan of the European Union, that will certainly help the company in becoming even more involved in sustainable matters.

Actually, the company had begun in 2017 its sustainable financing strategy through the issuance of three green bonds¹⁰⁰, of EUR 1.25 billion the first two, and EUR 1 billion the third, achieving impressive results in terms of oversubscription, that led to the observing of the greenium of 10 bps in 2019, as the graphs¹⁰¹ below show.



To ensure transparency, Enel, had provided a green bond report¹⁰² specifying, as these bonds are coherent with the ICMA principles, the nature of the projects financed through the proceeds raised, and the expected impact of these projects on the environment. In fact, Enel issued such green bonds to finance renewable, infrastructure, and network projects, and managed to achieve the following results¹⁰³

SUMMARY TABLE OF 2017, 2018 AND 2019 EMISSIONS WITH INDICATION OF THE INSTALLED CAPACITY AND OF THE CO₂ AVOIDED

GB emission	Area of investment	Allocated GB proceeds (mil euros)	Installed capacity (MW)	CO ₂ avoided (t)
2017	Renewables	1,238	3,354	14,528,985
2018		1,240		
of which new renewable projects	Renewables	575	1,878	4,676,669
of which new Infrastructure and Networks projects	I&N	665	n.a.	11,700
2019		986	638	116,867
of which new projects identified in 2019	Renewables	65	638	116,867
of which new Capex for 2018 projects	Renewables	342	n.a.	n.a.
of which new Capex for 2017 projects	Renewables	579	n.a.	n.a.

¹⁰⁰ Once per year, until 2019.

¹⁰¹ Source: Bloomberg. (2022)

¹⁰² See ENEL, Green Bond Report (2018). [Green Bond Report \(enel.com\)](https://www.enel.com/en/green-bond-report-2018)

¹⁰³ Specifically, in terms of CO₂ avoided. Data of the table refer to the 2018 issuance. See ENEL, Green Bond Report (2020). [Green-bond-report-2020_en.pdf](https://www.enel.com/en/green-bond-report-2020).

The financial community enthusiastically welcomed the report, as it signalled Enel’s commitment and leadership in the sustainable bond market¹⁰⁴.

Despite the outstanding results that Enel showed to be capable to achieve in the green bond market, since 2019 it decided to radically change its sustainable financial strategy and stop the issuance green bonds in favour of a new instrument: sustainability-linked bonds.

This decision was taken because of the strong commitment of the company towards sustainability, as the financial headquarters were searching for an instrument able to reflect the sustainable strategy of the issuer, without having to define a specific subset of green assets. The main reward for having a general-purpose characteristic is embodied in the lower cost of funding¹⁰⁵ when the sustainability targets are achieved.

KPIs and targets apply to the whole company, in fact, these instruments support transition strategies, and thus are ideal for those companies that haven’t managed to reach a sustainable level that could allow them to finance exclusively green projects with the capital raised from the issuance of use-of-proceeds bonds. However, this is not Enel’s case: as mentioned above, Enel has always been involved in sustainable matters, as it had created, already in 2008, the group Enel Green Power; so, its decision to switch towards the SLB instrument was mainly dictated by the wanting to signal a commitment of the whole company towards the sustainable matter.

The SLBs issued by Enel follow the ICMA sustainability linked bond principles¹⁰⁶, and, as such, require the specification of the KPIs to which the bonds are linked. Enel’s position is that of having linked each SLB to two KPIs: direct greenhouse gas emissions, belonging to scope 1 emissions¹⁰⁷, and renewable installed capacity percentage.

KPIs	KPI #1: Direct Greenhouse Gas Emissions Amount (Scope 1)				KPI #2: Renewable Installed Capacity Percentage				
	2023	2024	2030	2040 ¹	2022	2023	2024	2030	2040
Targets	148g CO _{2eq} /kWh	NEW 140g CO _{2eq} /kWh	82g CO _{2eq} /kWh	NEW 0g CO _{2eq} /kWh	60%	65%	NEW 66%	NEW 80%	NEW 100%

¹⁰⁴ As the head of J.P. Morgan, Marilyn P. Ceci, said “Enel’s 2018 Green Bond Report provides investors with comprehensive and substantive details on CO2 emission avoided as a direct result of renewable projects (...) This report and Enel’s work with groups such as the UN Global Compact demonstrate their thought leadership in their approach to sustainable finance which goes well beyond business as usual”. See ENEL GROUP, *Enel’s Green Bond Gets the Thumbs Up* (2019). [Enel’s Green Bond Report welcomed by the financial community | Enel Group](#)

¹⁰⁵ Referred to the previously developed concept of the greenium.

¹⁰⁶ Enel, being the first issuer of SLBs, significantly contributed to the development of these principles. See ICMA GROUP, *Sustainability-Linked Bond Principles Voluntary Process Guidelines* (2020).

¹⁰⁷ When it comes to reporting progress, to analyse the impact of greenhouse gas emissions, the terminology used to classify emissions is that of “scope 1, scope 2, and scope 3 emissions”. Scope 1 and 2 emissions are those controlled by the company, whereas scope 3 emissions are a consequence of the company’s activities but occur from sources not controlled by it.

As KPIs measure targets, both illustrated in the tables above¹⁰⁸, the failure in achieving any one of the two will result in a step-up of the coupon payment. The overall characteristics of the first sustainability-linked bond issued by Enel are summarized in the table¹⁰⁹ below.

Issuer/Guarantor	Enel Finance International NV/Enel SpA
Ranking	Senior Unsecured
Format	144A / Reg S
Ratings	Baa2/BBB+/A- (positive/stable/stable)
Tenor	5-year
Amount	1.5\$B
\$ Coupon	2.650%
Reoffer spread	125bps
Reoffer yield	2.676%
Upfront greenium	25bps
Bookrunners	BofAML, BNPP, CACIB, Citi, GS, JPM, MS, SG
Book	~4\$B (~3x)
Use of proceeds	General corporate purposes, including the repayment of existing indebtedness
Interest rate adjustment	II The rate of interest is subject to a one-time adjustment (+25bps) upon the non-satisfaction of the Renewable Installed Capacity Condition

The first sustainability-linked bond issued by Enel in 2019 amounted to USD 1.5 billion, with a maturity of five years, alongside with a 25 bps step up mechanism, linked to the ability of the company to achieve the SGD 7 target of 55% of renewable capacity by 2021. This was the event that marked the beginning of the sustainability-linked bond market.

In October of the same year, Enel launched the first euro denominated sustainability-linked bond, through a USD 2.5 billion triple tranche transaction: the first two tranches were linked, as for the first SLB, to SDG 7, while the third one was linked to the company's Scope 1 greenhouse gas emission reduction by 2030.

In both cases investors responded impressively to the issuances; in particular, more than USD 13 billion equivalent demand was reached, and a reduction in the cost of financing of around 15% was observed¹¹⁰.

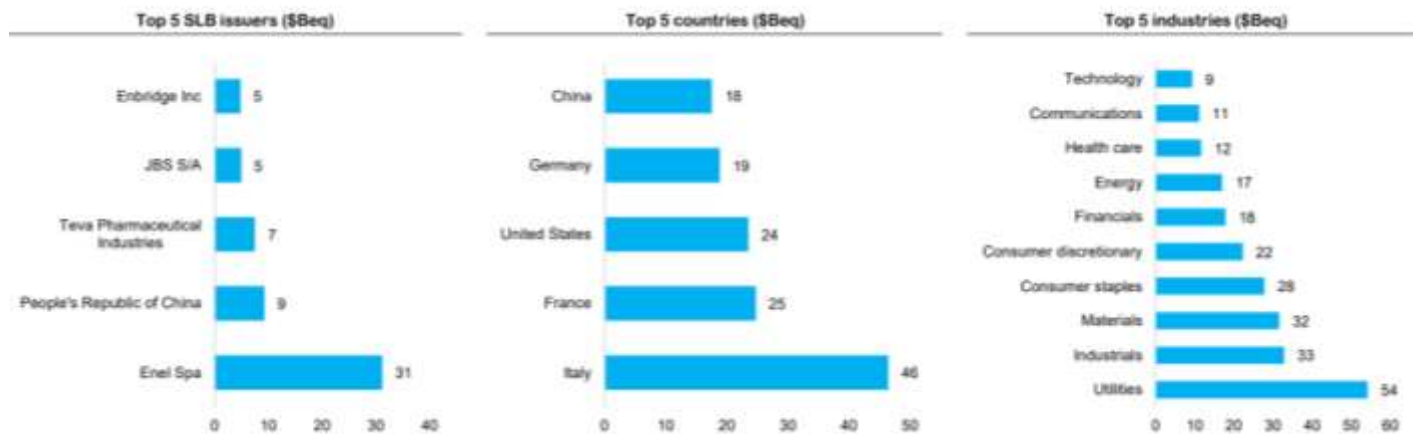
In 2021 Enel was also able to close the deal concerning the first ever sterling sustainability linked bond, of £500 million¹¹¹, making it the first company able to issue SLBs in all three major currencies: euro, US dollar, and sterling.

¹⁰⁸ KPI #1 focuses on SDG 13 related to climate action; KPI #2 on SDG 7, on affordable and clean energy. Source: Bloomberg (2022).

¹⁰⁹ The table summarizes Enel's first issued SLB characteristics.

¹¹⁰ Compared to conventional transactions. The 15% reduction reflects the greenium. See Della Vedova Nicole, WORLD ECONOMIC FORUM, *Sustainable Finance: Mobilizing capital to achieve climate goal*. (2021)

As of April 2023, Enel has managed to issue a total cumulative amount of USD 31 billion. This large volume allowed the company to rank in the top five global issuers of sustainability-linked bonds, and it counts for most of Italy’s involvement in the sustainability-linked framework. The charts below provide for data related to these achievements¹¹².



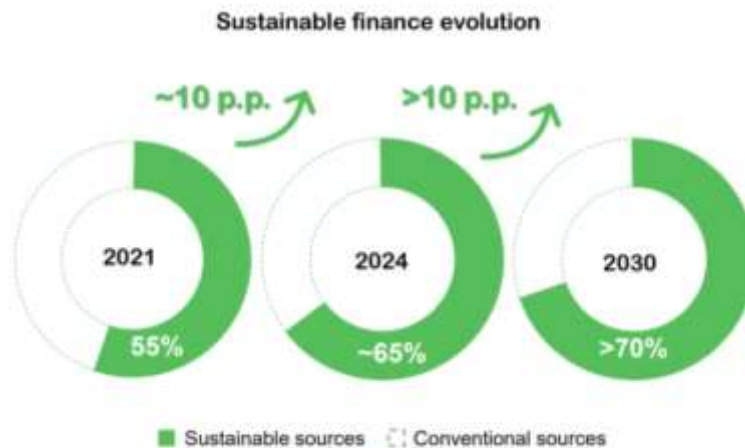
The huge cumulative amount of the transactions issued by Enel, also increasing over time, signals the strong link between the company and the sustainable matter; in fact, by 2030, Enel aims at achieving more than 70% of resources from sustainable sources. Although some challenges have been experienced throughout the 2020 period, characterized by the COVID-19 crisis, that slowed the development of the sustainability-linked market, Enel was the only company to have issued an SLB after its ground-breaking deals of 2019.

It appears evident from the discussion that the evolution of sustainable finance in Enel continues to increase, as the graphs below show¹¹³.

¹¹¹ The £500m, seven-year SLB, which was known as “Project Clash” internally, aligned with ICMA’s SLB principles, proved to be a success after raising an orderbook of more than £3bn, including a £214m order from Legal & General.

¹¹² Source: Bloomberg. (2022)

¹¹³ See ENEL, *Sustainability-linked Financing Framework* (2023). Source: Bloomberg. (2022)



The company, in fact, has been following a path towards full sustainability and has set future targets that will eventually lead to the final goal of having achieved a fully sustainability-linked financing framework¹¹⁴.

3.2. Towards A Sustainability-Linked Financing Framework

The mobilization of private and public capital towards Enel's sustainable strategy is crucially important to achieve the pre-determined SDGs: this allows the company to access a lower cost of debt and link the group's strategy to financial expenses.

To furtherly develop this approach, Enel developed in 2021 its Sustainability-Linked Financing Framework¹¹⁵, according to which it extends the sustainability-linked approach to all of its debt instruments. In these publications¹¹⁶ the links between sustainability and loans, credit lines, commercial paper, and bond issues are presented. In fact, Enel has expanded the range of sustainability-linked financing to signal a unified and coherent set of instruments available to the market and public finance domain. The instruments under the most recent framework are mainly focused on SDG 7 and 13¹¹⁷, but they also contribute to the environmental objectives set by the European Union in the EU Taxonomy Regulation.

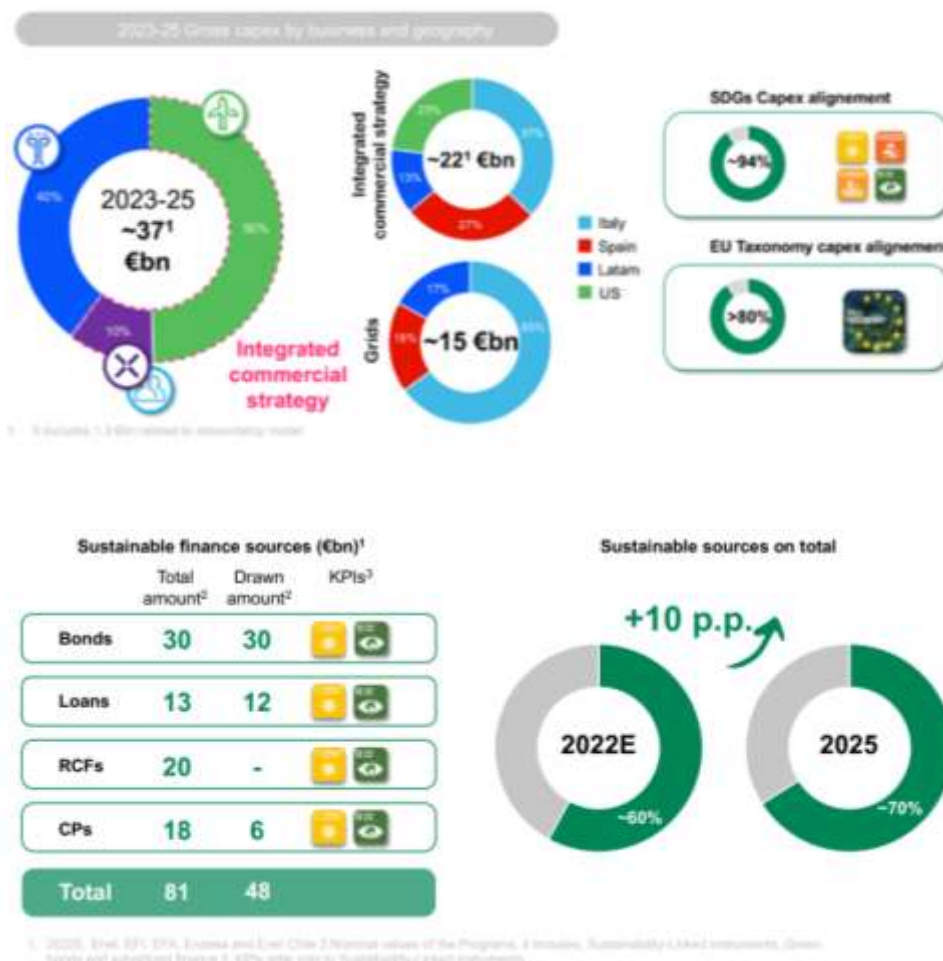
¹¹⁴ Enel has also issued two sustainability-linked loans (EUR 5 billion (April) and a EUR 1 billion (October)) and a commercial paper programme of up to EUR 6 billion to the same targets (SDG 13 for climate action, and 7 for affordable and clean energy).

¹¹⁵ See ENEL, Sustainability Linked Financing Framework. (2020)

¹¹⁶ Issued at least once a year.

¹¹⁷ Both related to climate change and environmental degradation.

As of 2023, sustainable finance sources present about 60% of Enel's Gross Debt¹¹⁸, and the aim of the company is to refinance upcoming maturities through the issuance of sustainability-linked instruments. Both the table and graphs¹¹⁹ below signal how the company's financial strategy is focused on sustainable finance.



In particular, the company's future investments will be concentrated, for the next three years, in the core countries¹²⁰, and CAPEX devoted will be aligned, for 94% with the SDGs, and 80% with the European Union Taxonomy.

¹¹⁸ These include, among others, Sustainability-Linked Bonds, Green Bonds, and Sustainability-Linked Loans.

¹¹⁹ Source: ENEL, Sustainability-Linked Financing Framework (2023).

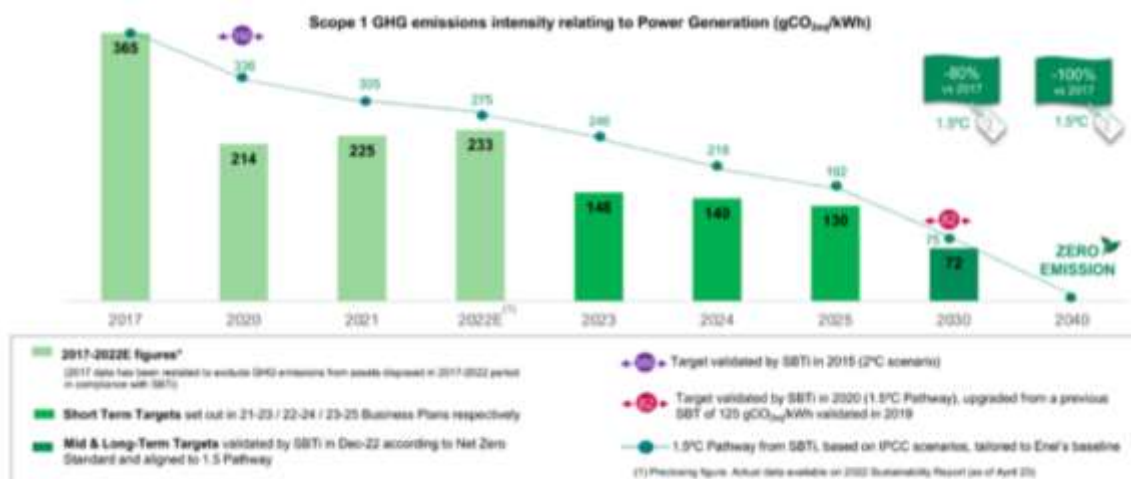
¹²⁰ Italy, Spain, Latam, and US. Over the 2023/25 period, the company plans to invest about €37 billion, 50% of which to support electricity generation, around 10% will be for customers and services, as part of an integrated business strategy, while around 40% will be aimed at power grids.

The proof that the company is materially contributing towards sustainability was asserted in December 2022, when Enel was able to achieve a new historic milestone: its decarbonization roadmap was certified by the Science Based Targets initiative (SBTi) as consistent with the Paris agreement goals of limiting global warming under 1.5° C.

To further improve its position and signal its commitment, Enel also comprehended in its February 2023 sustainability-linked financing framework scope 3 emissions for the first time, therefore adding the following KPIs: “Scope 1 and 3 GHG emissions Intensity relating to Integrated Power”, “Absolute Scope 3 GHG emissions relating to Gas Retail” and “Proportion of CAPEX aligned to the EU Taxonomy”¹²¹.

Enel’s key performance indicators, over the years, show that the company is seriously involved in the sustainable matter, and, in fact, is able to achieve its pre-determined targets. In particular, performance indicators comprehend:

- 1. Scope 1 GHG emissions Intensity relating to Power Generation (gCO₂eq/kWh):** this target measures the company’s performance on decarbonizing the energy’s production mix while mitigating direct emissions. The goal is that of full energy mix decarbonization by 2040, along with short term targets issued yearly¹²².



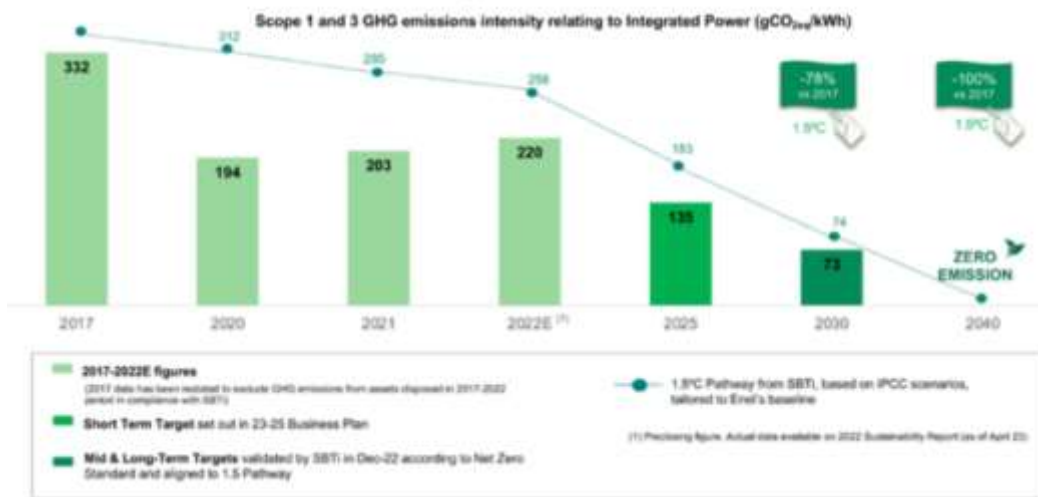
Target

¹²¹ See [Sustainability-Linked Finance | Enel Group | Enel Group](#).

¹²² These targets set in different business plan upgrades envisaged the following thresholds: 148 gCO₂eq/kWh by 2023, 140 gCO₂eq/kWh by 2024 and 130 gCO₂eq/kWh by 2025. Source: ENEL, Sustainability-Linked Financing Framework (2023).

Metrics / Year	2023	2024	2025	2030	2040
SPT	148 gCO _{2eq} /kWh*	140 gCO _{2eq} /kWh**	130 gCO _{2eq} /kWh***	72 gCO _{2eq} /kWh****	0 gCO _{2eq} /kWh**

2. Scope 1 and 3 GHG emissions Intensity relating to Integrated Power (gCO_{2eq}/kWh): the second KPI covers all electricity sold by Enel to end customers, sourced by both Enel’s own production and by electricity purchases made from other parties in those countries in which the company isn’t able to provide for total production. The alignment with the sustainable development goals, as it was in the first KPI, concerns SGD 13¹²³.



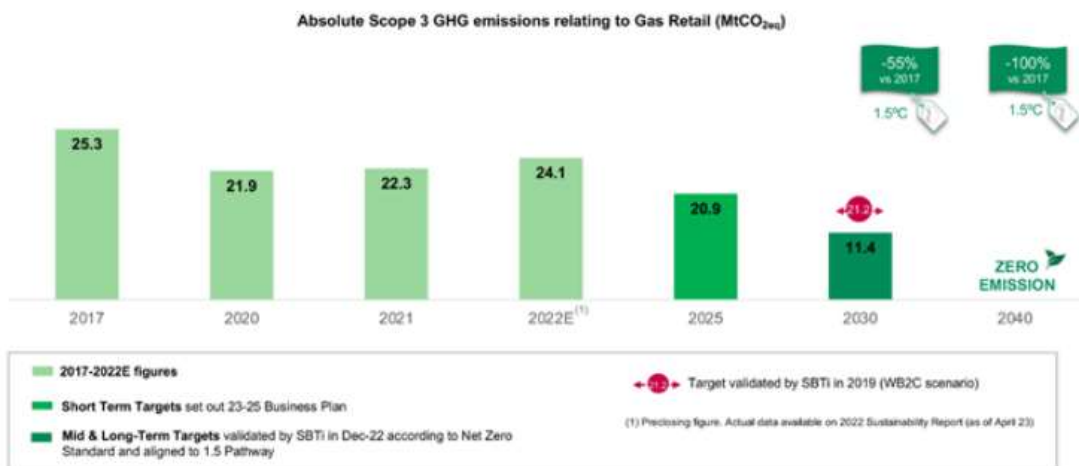
Target

Metrics / Year	2025	2030	2040
SPT	135 gCO _{2eq} /kWh*	73 gCO _{2eq} /kWh**	0 gCO _{2eq} /kWh*

3. Absolute Scope 3 GHG emissions relating to Gas Retail (MtCO_{2eq}): the third indicator fully supports the decarbonization goals of the company, including in particular the gas retail business, and as such, it is aligned with SDG 13¹²⁴.

¹²³ Source: ENEL, Sustainability-Linked Financing Framework (2023).

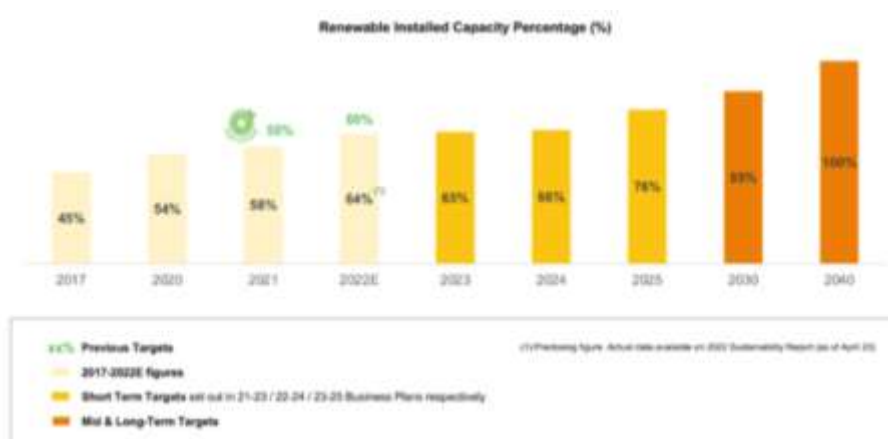
¹²⁴ Source: ENEL, Sustainability-Linked Financing Framework (2023).



Target

Metrics / Year	2025	2030	2040
SPT	20.9 MtCO _{2eq} *	11.4 MtCO _{2eq} *	0 MtCO _{2eq} *

4. Renewable Installed Capacity Percentage (%): this fourth KPI is also coherent with Enel’s full decarbonization by 2040 but measures the company’s performance through the development of renewables, towards 100% installed capacity percentage by 2040. The evolution process and forecasts are presented below¹²⁵.



¹²⁵ Source: ENEL, Sustainability-Linked Financing Framework (2023).

Target

Metrics / Year	2023	2024	2025	2030	2040
SPT	65 %*	66 %**	76 %***	85 %***	100 %**

5. Proportion of CAPEX aligned to the EU Taxonomy: this target supports Enel’s plan to invest to decarbonize the company’s activities. In fact, the transition towards net zero will require substantial investments in the coming decades. This indicator is, in fact, key to measure how much Enel is investing towards a carbon free business model. As stated above, in 2022, Enel announced EU taxonomy to align with more than 80% of CAPEX, for what concerns the period 2023/2025¹²⁶.

Target

Metrics / Year	2023 - 2025
SPT	80 %*

The KPI results and forecasts signal an excellent performance of the company in the path towards having an impact on the environment and achieving a well-established sustainable financing framework. In fact, as investors trust the company, they are more willing to devote their resources to promote its sustainable growth.

The increasing demand for the green instruments shows that investors believe in Enel’s business plan and are able to overcome doubts that might arise due to lack of issuers’ credibility when issuing sustainability-linked instruments. Investors’ trust has surely been promoted, over the years, by both the increasing importance of the company, which is well established over world-wide markets, and its accuracy in the reporting on sustainable matters, which shows a further attention for investors’ concerns. Given such conditions, it appears evident that the company will maintain its leading position in the sustainable markets, and, hopefully, many will follow the example that it is setting.

¹²⁶ Source: ENEL, Sustainability-Linked Financing Framework (2023).

Conclusion

Since the creation of the market for sustainable bonds in 2007 much progress has been made. In particular, after the adoption of the Paris Agreement and the SDGs, entities worldwide started to adopt more sustainable practices and include in their capital structure financing from debt instruments that support, directly or not, green projects.

In this context green and sustainability-linked bonds managed to establish themselves across worldwide markets, accommodating different investors' demand. The former represents an older instrument, that allows for a certain degree of security related to the use of proceeds, as investors know that their funds will be required to finance exclusively green projects; the latter instead provide for more flexibility, and thus allow issuers to focus on a sustainable transition strategy at the firm level.

The current and evolving state of the market suggests that green bonds not only have been able to open the market for sustainable bonds but are also managing to impose their dominance in the green sector.

This result is mainly favoured by the combination of the fact that having been the first sustainable instrument issued, green bonds have obtained general acceptance from most market participants, and also because of their resiliency. In fact, green bonds have been the instrument least affected by the adverse macroeconomic conditions of the last years, compared to others. This result is observed through the cumulative issued amounts that, even though were lower than prior years, were those who decreased less when compared to other thematic bonds.

Another element in favour of green bonds' persisting primacy in sustainable markets might be signalled by the current state of reporting. In fact, as most reporting entities are represented by financial institutions, which are among the main issuers of this instrument, and the most developed kind of reporting is the use of proceeds one, green bonds appear to have an advantage in transparency respect to SLBs.

Sustainability-linked bonds on the other hand, since their first issuance in 2019 have signalled a growth potential like no other thematic bond. However, the strong start of the instrument has slowed down particularly in 2022, both because companies, subject to the negative macroeconomic effects, couldn't cope with a sustainable transition strategy and were forced to reduce issued amounts, and because of an increase in investors' concern towards issuers' credibility.

However, the analysis suggests that the matter of issuer credibility is a problem common to both instruments. If on one hand investors investing in SLBs do not know which business practices they are funding, those investing in green bonds cannot be certain that the proceeds will be used to

finance sustainable projects. Reporting appears, thus, crucial. A clear adherence to international guidelines, such as the ICMA principles might help issuers in gaining investors' trust, as these require for clear and periodic reporting, and independent external reviews. A further step towards transparency will be taken when blockchain technology will become of common use among sustainable instruments.

In general, it can be stated that the market for sustainable bonds, comprehending both sustainability-linked and green ones, is on the path for further development, and as such we could expect further improvements in terms of rules concerning reporting standards and inclusion of blockchain technology.

Surely, in the short term, green bonds are expected to maintain their leading position, but as more companies will want to access the lower cost of financing linked to sustainable instruments' issuance, they will probably find it more convenient to issue sustainability-linked bonds, and promote sustainability at the firm level.

This was the idea adopted by Enel company, which is a strong believer of the fact that true commitment towards sustainable practices can only be proved through the issuance of sustainability-linked instruments. Enel, however, is an exceptional case, as it embodies the world leader in sustainable markets, promoting transparency like no other company. It is no surprise that it has managed to achieve outstanding levels in terms of oversubscription, which allowed it to gain lower cost of financing through the greenium.

The situation at this point will evolve in one of two ways.

On one hand, the advantageous current state of green bonds could allow these instruments to achieve first short and then long-term dominance. This could be promoted through a mechanism that feeds upon itself: as the market for green bonds is currently greater than that of SLBs and this situation is expected to persist in the short term, increasing issuance volumes might be accompanied by adjustments in these instruments' weaknesses, and thus furtherly promote investors' trust, increasing their demand and, in the end, an even greater issuance of such instruments will be observed.

On the other hand, sustainability-linked bonds might return to their initial growth level, prior to 2022, and eventually take the lead in sustainable markets. This could happen if issuers realise that the greater flexibility that they offer is worth the increase in impact reporting, and thus manage to address the problem of lack of transparency of the businesses' actions.

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