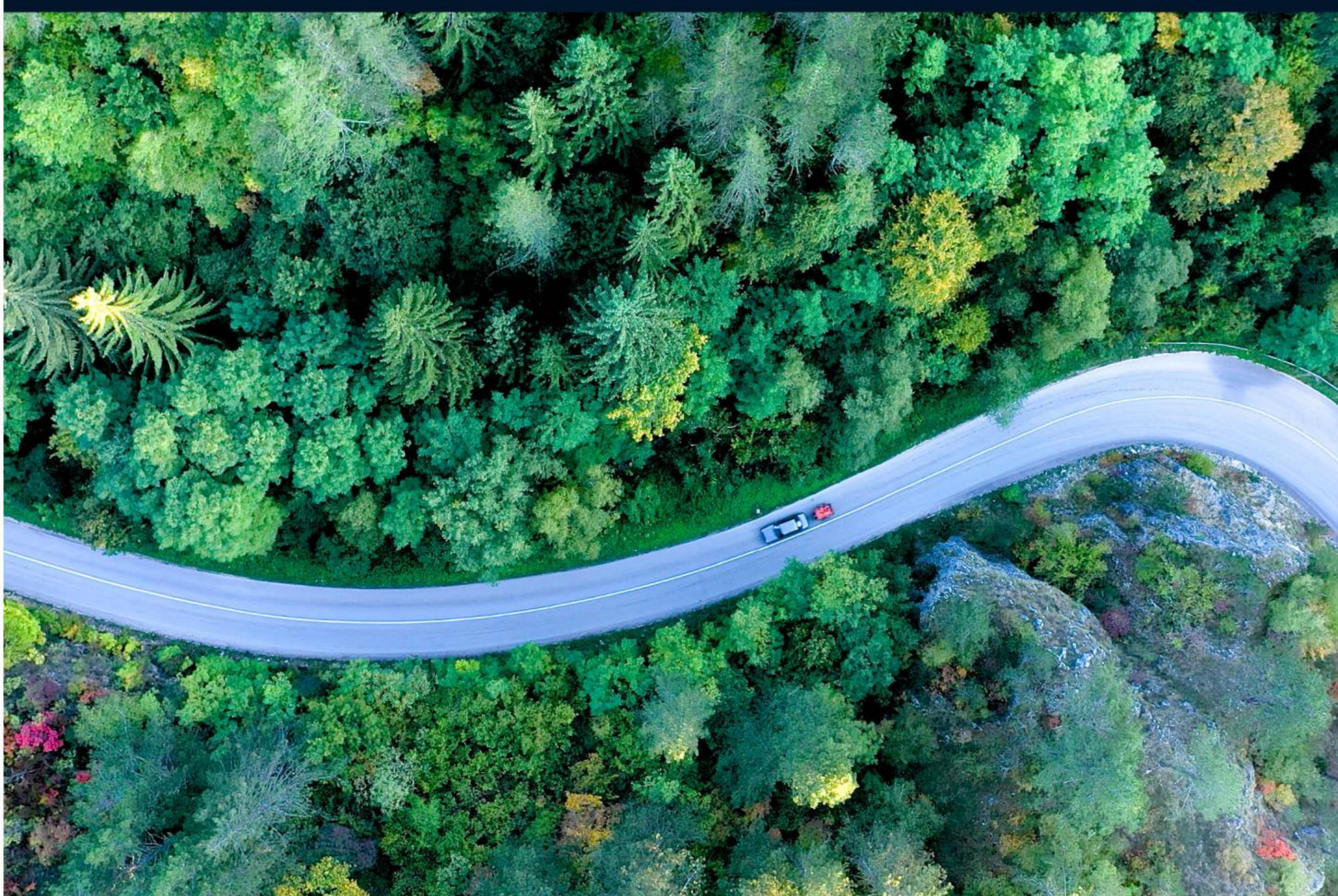
RESEARCH INSIGHT

Green Bonds and Climate — Towards a Quantitative Method

January 2024



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A previous version of this paper from May 2023 used incorrect data for Exhibits 2, 3 and 4. That data has been corrected.

Contents

Executive summary

Participants in the green-bond market have traditionally examined a green bond's "use of proceeds" — the type of green projects being financed or refinanced by the bond — to check the legitimacy of these projects and whether or not the bond was created in line with the four components of the Green Bond Principles (GBPs), a set of voluntary guidelines first published in 2014 by the International Capital Markets Association (ICMA).

While examining use of proceeds remains a key element of green-bond analysis, we highlight four additional metrics and measures that could be used to examine green bonds and their issuers in a more quantitative way. They represent a new set of lenses with which to tackle green-bond analysis:

1. Much of the information provided about the projects that green bonds finance (or refinance) can be highly qualitative. For a more quantitative approach, Total Portfolio Footprinting (TPF), from MSCI Research, can be used to estimate the level of CO2 emissions financed per USD million of outstanding bond (tCO2/USD million), something that is largely missing today.
2. To examine the emissions trajectory of the firm issuing a green bond, MSCI's Implied Temperature Rise (ITR) metric, expressed in degrees Celsius, estimates the global implied temperature rise (in the year 2100 or later) if the whole economy had the same climate trajectory as the company in question.
3. MSCI's Climate Value-at-Risk (Climate VaR) estimates the percentage economic value (EV) of a firm that is at risk due to climate-change-related shocks. Simply put, Climate VaR estimates the potential economic downside or upside a firm faces in terms of physical and transition climate-related risks.
4. It is also important to examine the terms set out in any sustainability-linked bond (SLB) that a firm may have issued, because SLB language could guide a firm's whole corporate and environmental strategy; though this comes with several caveats (Appendix 2).

To show the relevance of these four metrics and measures — TPF, ITR, Climate VaR and the terms of SLBs — we present a case study examining 18 green bonds issued by 14 companies. This case study illustrates how the metrics and measures laid out in this report might be used alongside green-bond use-of-proceed analysis. These metrics and measures may give a broader view with regards to the attributes of individual green bonds.

Use-of-proceeds analysis

In their use-of-proceeds disclosure, green-bond issuers declare which type of green project or projects the bond aims to finance or refinance. This format allows analysts to examine the legitimacy of such projects and to check whether the bond was created in line with the four components of the GBPs: use of proceeds, process for evaluation and selection, management of proceeds and reporting.

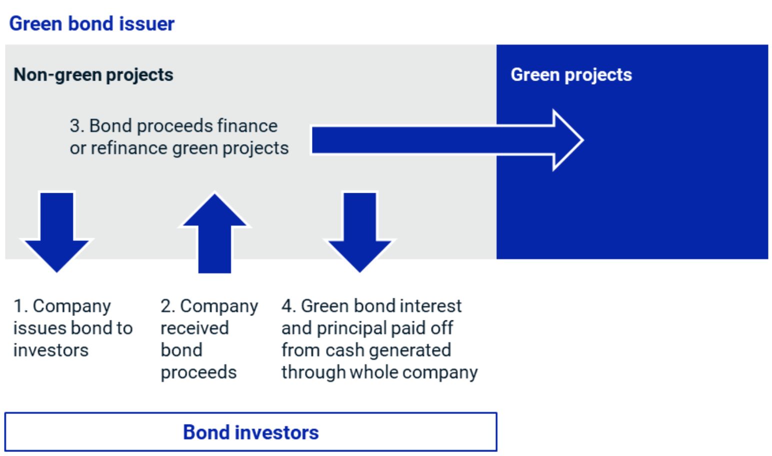
The GBPs allows for four types of green bonds:

- Standard Green Use of Proceeds Bond
- Green Revenue Bond
- Green Project Bond
- Secured Green Bond

The most widely issued of these is the Standard Green Use of Proceeds Bond.[1]

A Standard Green Use of Proceeds Bond finances or refinances one or more green projects. But while investors know that the bond will fund green projects, importantly this is not a project-finance bond. Standard Green Use of Proceeds Bond holders do not have to rely solely on the cash generated by the green projects to receive interest and principal back on the bond, instead they can rely on cash generated by both the green and non-green operations of the issuing firm. Hence holders of this type of green bond enjoy the whole credit strength of the issuing entity.

Exhibit 1: The Standard Green Use of Proceeds Bond format



Data as of March 2023. Source: ICMA, MSCI ESG Research

The Standard Green Use of Proceeds Bond format effectively means that almost any firm, from any industry, can issue green bonds as long as they have eligible green projects to finance or refinance. As such, far more green bonds can be issued than would be the case if only "pure play" companies — firms that are exclusively focused on the green economy — could issue green bonds.[2]

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[1] "Green Bond Principles: Voluntary Process Guidelines for Issuing Green Bonds." ICMA, June 2021.

[2] "Guidance Handbook." ICMA, June 2019.

Using a quantitative approach for key climate-related questions

While use-of-proceeds analysis remains at the heart of green-bond analysis, increasingly it will be important to examine two climate-related questions about the issuer:

- What does the issuer's emission trajectory look like? What is their climate impact?
- How is the issuer impacted by climate transition and physical risk? What are their climate risks?

Why does this matter? When Spanish energy firm Repsol S.A. issued a green bond in May 2017, the stated use of proceeds was to fund energy-efficiency projects and low-emission technology projects in its downstream refining and marketing business.[3] Many market participants objected, arguing the bond just allowed the firm to operate as a more efficient fossil-fuel company.[4] Similarly, a sovereign green bond issued by Poland in 2016 faced criticism, given that the country was comparatively highly reliant on coal for power generation.[5] Subsequent to these events, the GBPs were amended. They now include language around a firm's overall sustainability goals:

"*Issuers are encouraged to: position the information communicated…within the context of the issuer's overarching objectives, strategy, policy and/or processes relating to environmental sustainability*."[6]

In addition, the rise in SLB issuance (Appendix 1) illustrates growing market interest in the emissions trajectory of an issuing entity because SLBs include language stating that the interest the bond pays could change if the issuing firm fails to meet specific green or social corporate key performance indicators (KPIs) and future specific environmental or social targets.

The 2019 creation of the Net Zero Asset Owner Alliance (NZAOA), convened by the UN, was another catalyst for investors to consider the emissions trajectory of bond issuers.[7] NZAOA signatories[8] agreed to transition their investment portfolios to net-zero greenhouse gas (GHG) emissions by 2050: this incentivizes investors to examine the emissions trajectory of the issuing entity.

Possible metrics and measures for green-bond analysis

We highlight four measures that can be used to address these two climate-related questions. The three quantitative metrics (TPF, ITR and Climate VaR) examine slightly different issues:

- TPF looks at the current climate impact of investments at the security (bond) level.
- ITR looks at the future climate impact of the company at the issuer level.
- Climate VaR looks at the future climate risk, also at the issuer level.

The last measure, an analysis of the terms set out within SLBs, is undertaken at the security-level but may be relevant to an issuer's whole corporate-emissions trajectory.

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[3] Repsol EUR 500m 0.5% 5-year green bond

[4] Peter Cripps. "Repsol's green bond rocked the green bond market in May by reigniting the 'what is green' debate." *Environmental Finance*, June 7, 2017.

[5] Kate Allen and James Shotter. "Environmental qualms cloud Poland's green bond sale." *Financial Times*, Feb. 5, 2018.

[6] "Green Bond Principles: Voluntary Process Guidelines for Issuing Green Bonds." ICMA, June 2021.

[7] The alliance published its first 2025 target-setting protocol in January 2021 and its second edition in January 2022.

[8] "Climate change 2022: Mitigation of Climate Change: Summary for Policy Makers." Intergovernmental Panel on Climate Change, 2022.

Green bonds and climate: case study

Note: The case study is presented for illustrative purposes only. It does not intend to make specific claims for or against any bond, but only to illustrate the potential utility of the metrics and measures we have highlighted.

We examined 18 green bonds issued by 14 European firms in an illustrative case study (Exhibit 2). The companies in the study were chosen because they are European firms that issue bonds predominantly in euros or U.S. dollars and have issued at least one green bond. The choice was also impacted by the availability of financed-emissions data.

Exhibit 2: Illustrative case study including bond- and company-level data

Issuer Name	EUR Outstanding Amount	Coupon	Maturity Date	Bid Yield	Duration	OAS BID	OAS /Duration	Financed Emissions			ITR	Climate VaR	SLB/SLGB Outstanding?
								Scope 1	Scope 2	Scopes 1+2			
A2A SPA	400,000,000	1.000	16/07/2029	4.13	6.1	112.0	18.4	9.7	6.7	16.4	3.6	-19.4%	Yes
E ON	750,000,000	0.875	08/01/2025	3.61	1.8	19.3	10.7	3.6	6.6	10.2	2	-28.2%	No
E ON	850,000,000	1.250	19/10/2027	3.26	4.4	15.9	3.6	3.6	6.6	10.2	2	-28.2%	No
ENGIE SA	480,100,000	0.875	27/03/2024	3.60	1.0	37.9	39.9	9.7	6.7	16.4	1.8	-26.9%	No
ENGIE SA	750,000,000	2.125	30/03/2032	3.76	8.2	72.9	8.9	3.6	6.6	10.2	1.8	-26.9%	No
FAURECIA SE	400,000,000	2.375	15/06/2029	6.15	5.7	310.7	54.8	3.9	6.9	10.8	1.6	-8.5%	No
IBERDROLA	750,000,000	3.125	22/11/2028	3.36	5.2	28.1	5.4	3.4	6.3	9.7	1.4	-11.4%	No
KONINKLIJKE PHILIPS NV	750,000,000	0.500	22/05/2026	3.74	3.1	49.7	16.2	1.2	0.1	1.3	2.9	-11.3%	No
KONINKLIJKE PHILIPS NV	650,000,000	2.125	05/11/2029	3.88	6.1	86.3	14.1	1.2	0.1	1.3	2.9	-11.3%	No
ORSTED A/S	600,000,000	2.250	14/06/2028	3.48	4.9	40.5	8.3	3.4	6.3	9.7	1.8	-4.3%	No
POSTNL NV	300,000,000	0.625	23/09/2026	4.06	3.4	86.2	25.4	2.7	6.2	8.9	1.3	-12.4%	No
PROLOGIS	550,000,000	0.375	06/02/2028	4.15	4.8	107.6	22.4	2.8	6.2	9.0	1.3	-4.1%	No
RWE AG	1,000,000,000	2.125	24/05/2026	3.61	3.0	33.7	11.3	3.4	6.3	9.7	1.9	-43.0%	No
SEGRO CAPITAL SARL	650,000,000	1.250	23/03/2026	5.28	2.9	200.0	68.9	1.0	5.7	6.7	1.6	-5.5%	No
UNIBAIL-RODAMCO	643,748,000	2.500	26/02/2024	3.90	0.9	45.7	52.5	1.0	5.7	6.7	1.6	-4.0%	No
UPM-KYMMENE OYJ	750,000,000	0.125	19/11/2028	3.59	5.6	55.5	9.9	20.3	6.3	26.6	2.2	-2.8%	No
UPM-KYMMENE OYJ	500,000,000	2.250	23/05/2029	3.73	5.7	69.2	12.1	98.6	102.8	201.4	2.2	-2.8%	No
VOLKSWAGEN FINANCE NV	1,250,000,000	0.875	22/09/2028	3.92	5.3	89.9	17.0	3.9	6.9	10.8	3.4	-11.2%	No

Data as of March 31, 2023. CVaR scenario considered is "2°C orderly, average." Source: MSCI ESG Research, Refinitiv

MSCI uses the TPF green bond methodology to estimate the tCO2E/USD million outstanding of green bond, if these bonds are part of the MSCI BBG Green Bond Index. Of the 18 green bonds in this case study, we use the TPF green bond method to estimate the tCO2E/USD million of bond outstanding for 15 bonds; and we use the TPF corporate bond method for 3 bonds: the Philips 2026s, the Philips 2029s and the UPM 2029s. The TPF green bond method is found on pages 34-37 of the MSCI ESG Research *Total Portfolio Methodology* document October 2023; the corporate bonds method is found on pages 9-14.

The grey columns in Exhibit 2 provide information specific to the bonds analyzed in the case study. The first three green columns (financed emissions) are estimates of the Scope 1 and Scope 2 emissions financed by each bond in terms of tCO2/USD million of the outstanding principal (derived from TPF analysis). They range from less than 1 tCO2/USD million to close to 200 tCO2/USD million. The last three green columns provide data about the firms issuing the bond: the company's ITR, its Climate VaR and whether it has also issued a SLB.

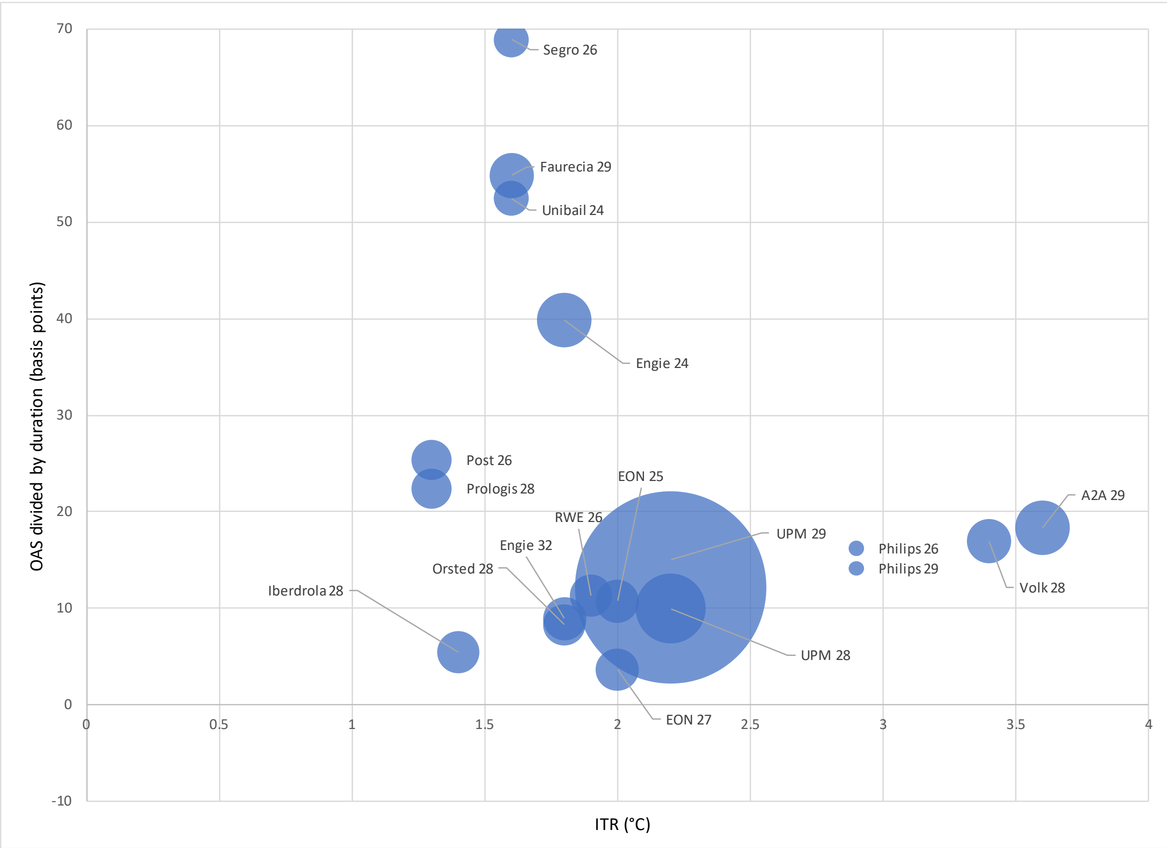
Of the 14 firms, three have ITRs (which represents climate impact) below 1.5°C: Iberdrola, PostNL and Prologis Inc. However, all have negative Climate VaRs (climate risk). Only A2A, an Italian utility, has issued an SLB.

A commercially-minded investor might seek out firms with postive Climate VaR readings. Impact investors might seek out firms with positive Climate VaR readings, while also looking to avoid bonds issued by firms with high ITR figures.

Green bonds and climate impact

Exhibit 3 charts the 18 green bonds in our case study: the x-axis represents the ITR associated with the bond's issuer, while the y-axis presents that bond's option-adjusted spread (OAS)[9] divided by the bond's duration. We divide the spread by duration so we can compare the relative spread attractiveness of bonds with different maturities and coupons. The size of each circle reflects the estimated financed emissions of the bond in terms of tCO2/million.

Exhibit 3: Issuer ITR vs bond OAS divided by duration



Size of bubbles represents TPF (tC02/USD m outstanding principal) of each green bond. Data as of March 31, 2023. Source: MSCI ESG Research, Refinitiv

Other things being equal, impact investors may want to maximize the spread they receive, while avoiding bonds from firms with ITRs significantly above 1.5°C. Three bonds have OAS/duration spreads greater than 50 basis points (Segro 2026, Faurecia 2029 and Unibail 2024) but the firms issuing these bonds have ITRs above 1.5°C.

[9] The OAS is the measurement of the spread difference between a fixed-income security and the risk-free rate of return (where government bond yield is used to represent the risk-free rate) adjusted to take into account any embedded option in the fixed-income security.

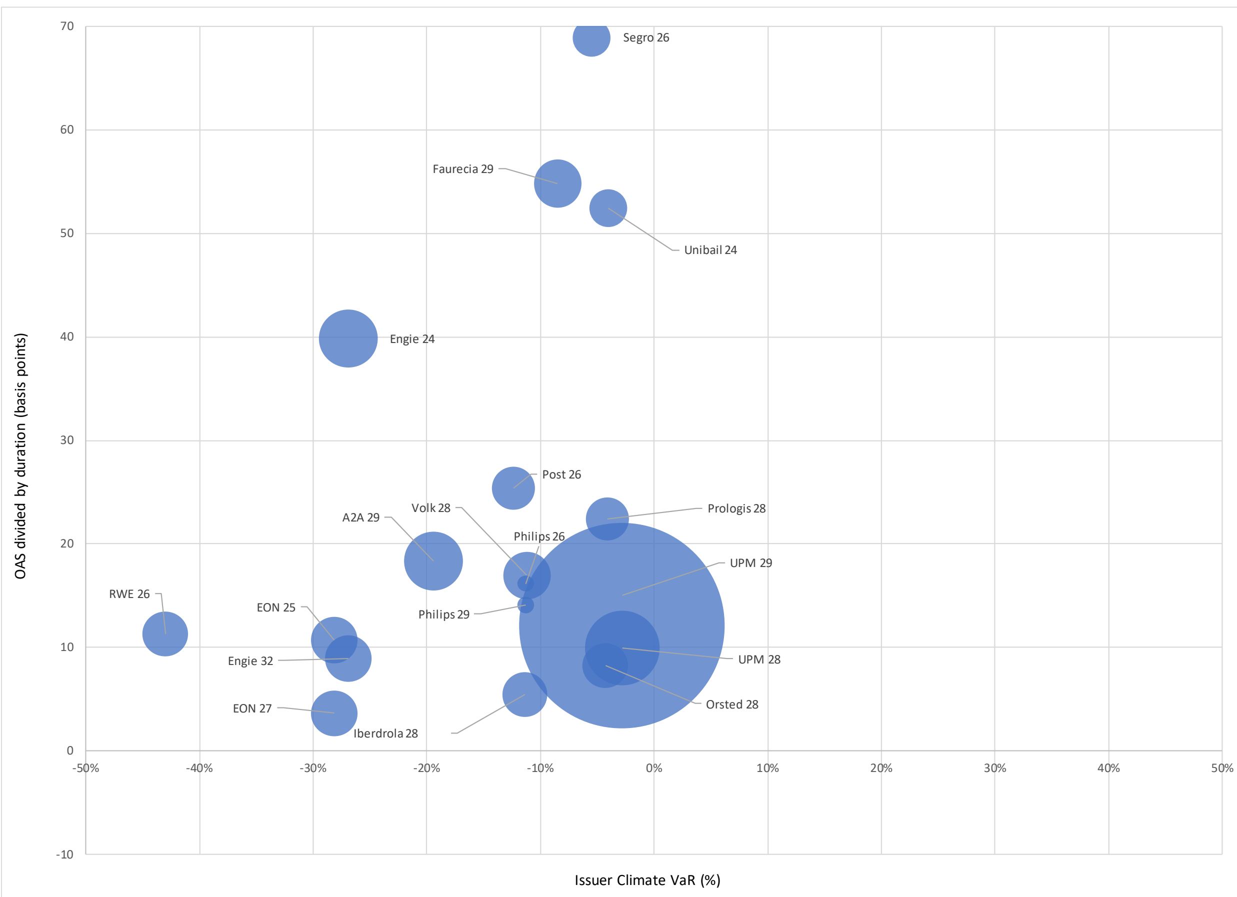
Where one finds bonds paying relatively similar levels of spread per unit of duration and with similar ITR scores, one can still distinguish between the bonds in terms of the financed emissions, bearing in mind that in Exhibit 3 a smaller circle represents a smaller bond-financed-emission number.

Green bonds and climate risk

Exhibit 4 charts the same 18 green bonds: the x-axis plots the climate VaR of the firms that issued the bonds, while the y-axis plots the OAS of each bond divided by the bond's duration. The size of each bubble represents the estimated financed emissions of the bond in terms of tCO2/USD million outstanding.

All of the 18 green bonds under consideration are issued by firms with negative Climate VaR figures, including the three bonds with the highest spread per unit of duration (Segro 2026, Faurecia 2029, Unibail 2024).

Exhibit 4: Issuer Climate VaR vs OAS divided by duration



Size of bubbles represents TPF (tC02/USD m outstanding principal) of each green bond. Data as of March 31, 2023. CVaR scenario considered is "2°C orderly, average." Source: MSCI ESG Research, Refinitiv

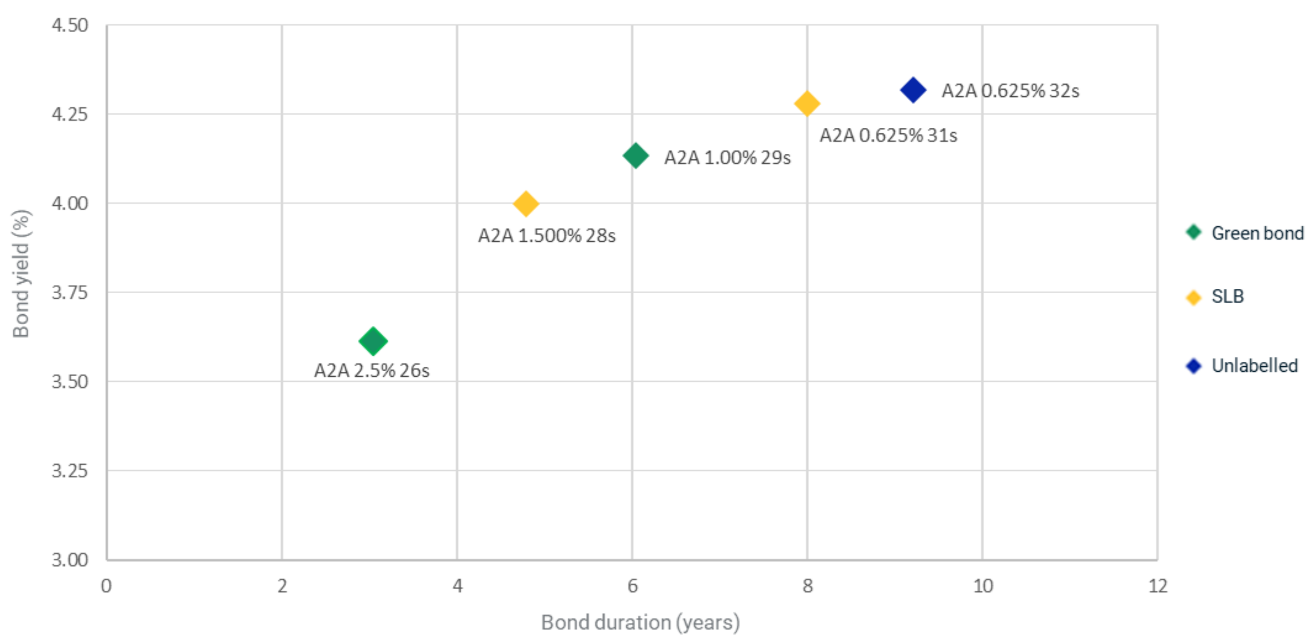
Green bonds and sustainability-linked bonds: A2A

SLBs differ from green, social and sustainability (GSS) bonds in two ways. First, while GSS bonds are use-of-proceeds bonds, i.e. bonds that fund specific green and/or social projects, SLBs are "general purpose" bonds — bonds that finance or refinance any type of project. Second, SLBs set out environmental or social KPIs and targets to be met by the issuer, and a penalty (i.e. coupon step-up) for not doing so, while GSS bonds do not.

As mentioned earlier, the only firm in this study that issued a SLB is A2A. In July 2021 the company issued the EUR 500 million 0.625% July 15, 2031 SLB. The bond's coupon will rise by 0.25% if A2A's CO2 emission intensity does not fall below 296g CO2/KWh by Dec. 31, 2025. This will be externally verified by DNV, an international accredited registrar and classification society.[10] A2A's emissions intensity was 345g CO2/KWh in 2019.[11]

In March 2022, A2A issued the EUR 500 million 1.5% March 16, 2028 SLB. The bond's coupon will rise by 0.25% if the firm's renewable energy capacity does not reach 3,000 MW by Dec. 31, 2024. This figure will be verified by consultancy firm RINA.[12] A2A had 2,100 MW of installed renewable energy capacity in 2019.[13] Exhibit 5 charts some of A2A's green bonds, SLBs and non-labelled bonds outstanding.

Exhibit 5: Euro-denominated A2A Bonds



Data as of March 31, 2023. Source: MSCI ESG Research, Refinitiv

[10] A2A EUR 500 million 0.625% July 15, 2031 bond, "Final Terms; Execution Version."

[11] "Sustainable Finance Framework." A2A, February 2022.

[12] A2A EUR 500 million 1.5% March 16, 2028 bond, "Final Terms; Execution Version."

[13] "Sustainable Finance Framework." A2A, February 2022.

The bond terms laid out in A2A's SLBs are potentially relevant for all its bonds. If the terms incentivize A2A to achieve these goals, the firm becomes greener, potentially making its bonds more attractive to impact investors. The firm's bonds may also become more attractive to mainstream investors, if they think a greener A2A is more profitable and faces less risk.

Conclusion

Although analyzing a green bond's use of proceeds remains central to understanding its offering, additional metrics can provide supplemental information:

- TPF can estimate the CO2 emissions that a bond finances.
- ITR can estimate the firm's future climate impact.
- Climate VaR can estimate the impact of climate risk — both physical and transition — on the issuing entity.

Impact investors may be especially drawn to the insights that the TPF and ITR metrics can provide, while Climate VaR information may be of equal interest to impact and mainstream bond investors.

Appendix 1: A brief history of labelled bonds

Green, social and sustainability bonds

Simply put, the green-bond market allows investors to buy bonds that finance or refinance green projects. This market cuts the transaction costs involved in matching green-bond buyers and sellers and has broadened and deepened since the first green bond was issued in 2007.[14] Today we speak of labelled bonds, which are made up of GSS bonds and SLBs.

Outstanding labelled bonds at the end of Q4 2022 stood at USD 2.9 trillion. While their issuance fell by 24% in 2022 compared to 2021, this was a less dramatic decrease than the 30% fall in overall bond market issuance for the same period.[15]

Exhibit A1: Labelled bond issuance, 2014 – 2023 YTD

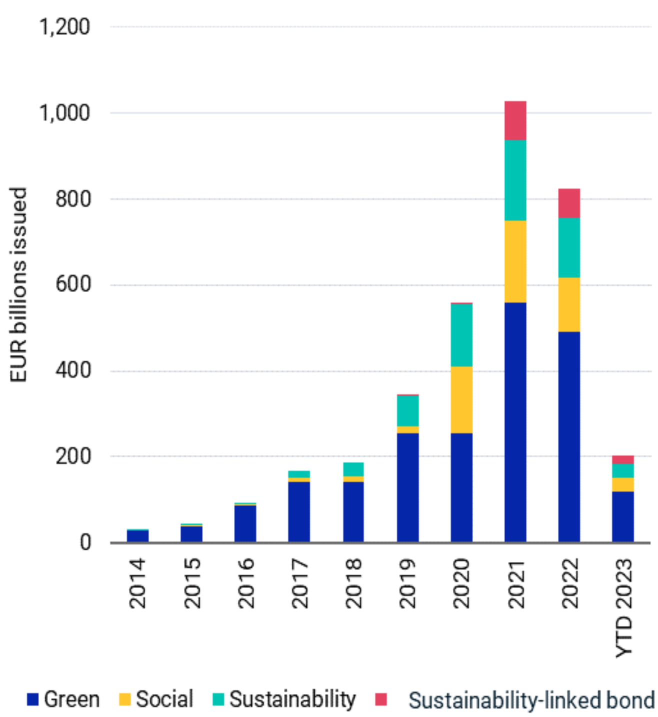
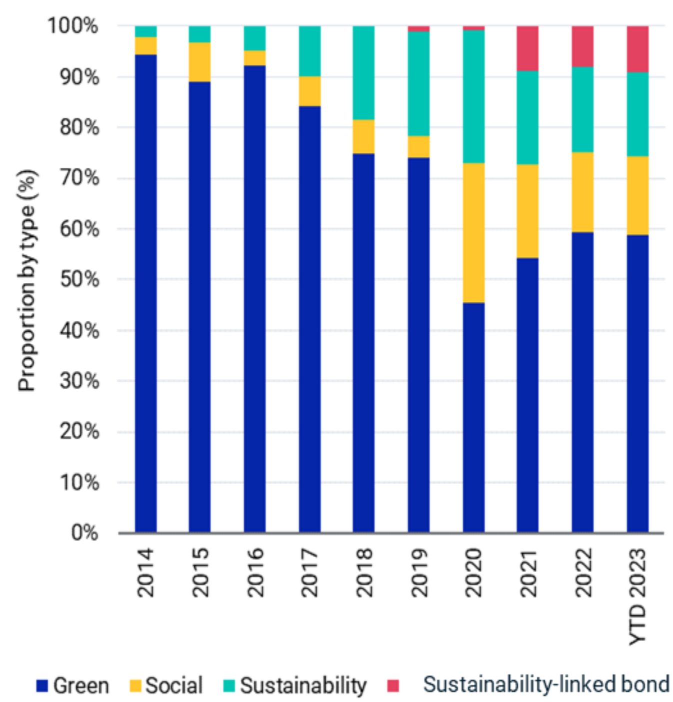


Exhibit A2: Labelled bond issuance by type, 2014 – 2023 YTD



Data as of March 2023. Source: MSCI ESG Research, Refinitiv

[14] The European Investment Bank's EUR 600m five-year bond matured in 2012.

[15] "Labelled bonds; quarterly update: Q4 2022," MSCI Research, March 2023 (Client access only).

The GBPs bring together a powerful combination of structure and flexibility that has allowed the market to flourish. Although they set out four steps needed to create a green bond, they leave open the question of exactly what a green bond can fund. GBPs set out ten types of green projects that can be funded, but the list is purposefully left incomplete and inexhaustive.[16]

While the GBPs do not define what is green, they require a substantial amount of information to be provided when a green bond is issued, as well as throughout its life. Green bonds are accompanied by a green-bond framework and ideally a second-party opinion when they are issued, and by annual reports during its life stating how the bond's funds have been spent.

The green-bond framework describes how the issuing entity is going to approach the issuance of green bonds and how it will remain in line with the GBPs.

A second-party opinion states whether the green bond is created in line with the GBPs. The documentation often includes a lengthy description of the green projects to be funded.

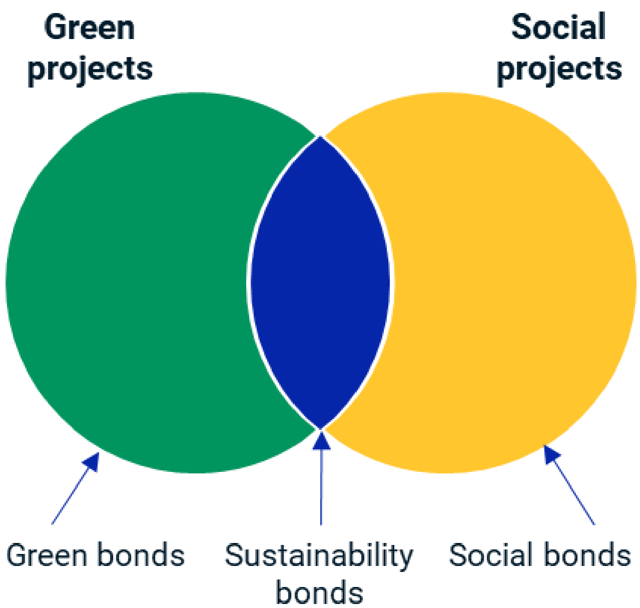
As part of the green-bond-market development, 2014 saw the creation of the Bloomberg MSCI Green Bond Index. Bloomberg L.P. and MSCI ESG Research conducted consultations with a set of index stakeholders to solicit feedback on index design and methodology. MSCI ESG Research established clearly defined rules for classifying green bonds. These rules built upon the GBPs, but defined the use of proceeds eligibility criteria in a way that allowed for the establishment of an index. Bloomberg applied fixed-income criteria to the index.

MSCI examines green bonds to decide if they are fit for inclusion in the index. This involves examining self-labelled green bonds to decide if they meet the criteria as laid out in the MSCI Labeled Bond and Loan Assessment Methodology and monitoring green bonds during their life. MSCI will declare a bond no longer eligible for the index if it ceases to meet the criteria.

The success of green bonds then led to the rise of social and sustainability bonds. ICMA aided market expansion through the publication of the Social Bond Principles (SBPs) and the Sustainability Bond Guidelines (SBGs). A social bond funds social projects that aid one or more disadvantaged groups in society. A sustainability bond funds green and social projects (Exhibit A3).

[16] Renewable energy; energy efficiency; pollution prevention and control; environmentally sustainable management of living natural resources and land use; terrestrial and aquatic biodiversity conservation; clean transport; sustainable water and wastewater management; climate change adaptation; circular economy adapted products, production technologies and processes; green buildings that meet regional, national or internationally recognized standards or certifications for environmental performance.

Exhibit A3: GSS bonds



Data as of March 2023. Source: ICMA, MSCI ESG Research

The SBPs set out an indicative list of six types of social project that can be funded by social bonds. Sustainability bonds can fund both green and social projects, including any of the sixteen types of green and social projects noted in Exhibit A4.

Because GSS bonds fund either green or social projects, they can be seen as impact investments. To advance the impact case for GSS bonds, the ICMA published a document mapping the projects funded by these bonds to the UN Sustainability Development Goals (SDGs).[17] ICMA's document sets out which of the 17 SDGs are supported by each of these sixteen projects (Exhibit A4).

[17] "Green, Social and Sustainability Bonds: A High-Level Mapping to the Sustainable Development Goals." ICMA, June 2022.

Exhibit A4: How green and social projects can advance the UN SDGs

	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15
GBP Category															
Clean transport											Y				
Climate change adaptation	Y	Y											Y		
Eco-efficient and/or circular economy								Y			Y	Y			
Energy efficiency							Y	Y	Y						
Sustainable management of resource & land		Y									Y	Y		Y	Y
Green buildings											Y				
Pollution prevention and control			Y								Y	Y			
Renewable energy			Y				Y	Y	Y		Y	Y	Y		
Sustainable water, wastewater management						Y					Y	Y			
Terrestrial, aquatic biodiversity conservation		Y				Y					Y			Y	Y
SBP Category															
Access to essential services	Y	Y	Y	Y	Y			Y	Y	Y					
Affordable housing	Y										Y				
Socio-economic advance & empowerment	Y	Y		Y	Y			Y		Y	Y			Y	Y
Affordable basic infrastructure		Y	Y			Y	Y		Y		Y		Y		
Food security		Y										Y			
Employment generation								Y	Y						

Data as of March 2023. Source: ICMA, MSCI ESG Research

Some green-bond-market participants have pushed for the creation of a separate "transition-bond" label. Firms issuing transition-type bonds include Castle Peak Power in Hong Kong, which in 2021 issued the USD 300 million 2.125% March 3, 2031 energy transition bond. Those pushing for a separate transition-bond label thought that such a label might promote the issuance of bonds that cut emissions without investing in a wholly green technology. For the time being, however, ICMA has not recognized a separate transition-bond label.

In 2016, the International Finance Corporation issued a USD 152 million "forestry bond." This was a general-purpose corporate bond. However, buyers of the bonds were offered a choice of receiving their interest in cash or in the form of carbon credits.[18] The carbon credits were generated from an African reforestation project. This was described as a green-coupon bond because although the bond is not green, the coupon can be received in the form of a green instrument, i.e. carbon credits.

[18] If carbon credits were left unpurchased, BHP Billiton was available to buy up the unutilized credits.

Sustainability-linked bonds

SLBs differ from GSS bonds in two ways. First, while GSS bonds are use-of-proceeds bonds, bonds that fund specific green and/or social projects, SLBs are general purpose bonds, bonds where the proceeds can be used to finance or refinance any type of project. Second, while SLBs set out environmental or social KPIs and targets to be met by the issuer and a penalty for not doing so, GSS bonds do not.

The specific KPIs and targets contained within SLBs apply to the whole issuing entity — hence the insights gained could impact valuations for the whole company, rather than just being relevant at the individual SLB level. SLB issuance might signal a clear new direction for the company. However, four conditions need to be met for the individual SLBs to have this impact: the SLB needs to be long dated; the KPIs and targets need to be stretching; the penalty of not achieve the KPIs need to be significant; the cost of calling the SLB needs to be high. Only if these conditions are met is the SLB likely to significantly impact the issuer's corporate journey. We see this as a matter of logic: SLB language is only likely to compel a firm to act in a particular way if it is expensive or prohibitive not to do so.

ICMA has recognized the importance of the SLB KPIs and targets being stretching. They state that sustainability performance targets (SPTs) should "represent a material improvement in the respective KPIs and be beyond a 'business as usual' trajectory."[19]

Recently, some firms have issued bonds that combine green use-of-proceed projects, with a penalty/coupon step-up language. These are known as sustainability-linked green bonds (SLGBs).[20] For example Verbund AG, an Austrian utility, issued the EUR 500 million 0.9% April 1, 2041 SLGB.

Exhibit A5: Use-of-proceeds bonds compared to SLBs

	GSS			SLBs	SLGBs
Label	**Green**	**Social**	**Sustainablity**	**Sustainability-linked**	**Sustainability-linked green**
Bond type	Use of proceeds	Use of proceeds	Use of proceeds	General corporate purpose	Use of proceeds
Main focus	Security level	Security level	Security level	Issue level	Security level + issue level
Coupon step up language?	No	No	No	Yes	Yes
ICMA	Green-bond principles	Social bond principles	Sustainability bond guidelines	Sustainability-linked bond principles	Sustainability-linked bond principles Green-bond principles

Data as of March 2023. Source: ICMA, MSCI ESG Research

[19] "Sustainability-Linked Bond Principles: Voluntary Process Guidelines." ICMA, June 2020.

[20] ICMA's Sustainability-Linked Bond Principles allow for the issuance of SLGBs: "The proceeds of SLBs are intended to be used for general purposes, hence the use of proceeds is not a determinant in its categorization. Regardless, in select cases, issuers may choose to combine the GBPs/SBPs approach with the SLBP.".

Appendix 2: Metrics overview

Total Portfolio Footprinting

One of the key attractions of green bonds for impact investors is the green projects that they finance. Yet information on these projects is highly qualitative, making it challenging to compare green bonds. MSCI's TPF measure which estimates the tonnes of CO2-equivalent emissions per USD 1 million invested (tCO2e/USD million), based on methodology from the Partnership for Carbon Accounting Financials, can help fill this void, providing a quantitative basis to compare green and non-green bonds and green bonds with each other.

While TPF uses different methods to estimate the financed emissions of green and non-green bonds, a quantitative comparison between the two is now feasible using TPF, including for bonds issued by the same firm. In addition, two green bonds will have different financed-emissions estimates if they fund different combinations of green projects. This is because under TPF, the green-bond-financed emissions are calculated at a project level rather than at issuer level.

Implied Temperature Rise

MSCI's ITR is a forward looking climate impact metric expressed in degrees Celsius which estimates the global implied temperature rise (in the year 2100 or later) if the whole economy had the same climate trajectory as the company in question.

The ITR measure is also designed to support reporting for the Task Force on Climate-related Financial Disclosures (TCFD). ITR reviews a company's existing and projected carbon dioxide emissions, considering the firm's reduction targets, and estimates the future global temperature rise aligned with that company's activities.

Climate Value-at-Risk

MSCI's Climate VaR model estimates the percentage company EV at risk from climate-change-related shocks. Climate VaR represents the sum of climate transition risk and climate physical risk. Transition risk climate VaR itself is made up of policy climate VaR and technology opportunities. Physical climate VaR is constructed out of ten different climate-related hazards, five of which are acute or catastrophic and five of which are chronic.

Appendix 3: European Union green-bond standard

The recent growth of the green-bond market has been overseen by the ICMA. However, regulators are increasingly looking to guide and influence this market.

The EU's High-Level Expert Group on sustainable finance proposed that the EU introduce a standard defining what a green bond is. This became a proposal in the European Commission's 2018 action plan on financing sustainable growth and is part of the European Green Deal. The European Green Deal investment plan of Jan. 14, 2020, then announced that the European Commission would establish an EU green-bond standard (EUGBS).

Once adopted by co-legislators, this proposed regulation could set a standard for how firms and public entities can use green bonds to raise capital-market funds labelled as green. The new EUGBS will be open to any issuer of green bonds, including firms and public authorities located outside the EU.

It will comprise of four elements:

1. Alignment with EU-taxonomy — proceeds from EU green bonds should go to finance or refinance projects/activities that:
    a) contribute substantially to at least one of the six environmental objectives of the taxonomy,
    b) do not significantly harm any of the other objectives,
    c) comply with the minimum social safeguards,
    d) meet technical screening criteria when such criteria have been developed, allowing however for specific cases where these may not be directly applicable.
2. Publication of a green-bond framework, which confirms the voluntary alignment of green bonds issued with the EUGBS, explains how the issuer's strategy aligns with the environmental objectives, and provides details on all key aspects of the proposed use of proceeds, processes and reporting of the green bonds.
3. Mandatory reporting on use of proceeds (allocation report) and on environmental impact (impact report).
4. Mandatory verification of the green-bond framework and final allocation report by an external reviewer.[21]

[21] "Report on EU Green Bond Standard." EU Technical Expert Group on Sustainable Finance, June 2019.

Additional reading

MSCI resources

- Carbon-Emissions Data to Inform the MBS Market
- ESG and the Cost of Capital
- Labeled Bond and Loan Assessment Methodology
- The Implied Temperature Rise of 'Paris Aligned' Indexes
- The MSCI Net-Zero Tracker
- Total Portfolio Footprinting to Transform Green-Bond Emission Accounting
- Understanding MSCI's Climate Metrics
- What Implied Temperature Rise Means for Funds
- Why Your Portfolio May be Hot, Cold or Just Right
- Afsaneh Mastouri, Rohit Mendiratta, Guido Giese. "Corporate Bonds and Climate Change Risk." Journal of Portfolio Management, vol 48, number 10, October 2022.
- Yoon Young Chung, Meghna Mehta, Vishakha Pandey. "Is The Honeymoon Over for Green Bonds?" ESG and Climate Trends to Watch for 2023, MSCI ESG Research, December 2022.

Other resources

- "Climate Change 2022: Mitigation of Climate Change — Summary for Policymakers." Intergovernmental Panel on Climate Change, 2022.
- "Green, Social and Sustainability Bonds: A High Level Mapping to the Sustainable Development Goals." ICMA, June 2022.
- "Report on EU Green Bond Standard." EU Technical Expert Group on Sustainable Finance, June 2019.

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