

GREEN BOND PRICING IN THE PRIMARY MARKET:

January-June 2023

H1
(Q1-Q2)
2023

Report highlights

- Largest semi-annual sample to date: 111 green bonds with combined volume of USD124.6bn
- Green bonds in both EUR and USD performed well on all metrics in the primary market, on average
- The greenium was observed for 16 bonds in our sample
- Allocations to green investors remain stable at 66%
- Three EU sovereigns returned to the green bond market and Israel priced its debut deal
- Green bond ETF assets achieved net growth of 20% on the prior period
- Spotlight: Quality discernment in the SLB market

Climate Bonds INITIATIVE

Prepared by Climate Bonds Initiative

GB-TAP Green Bond Technical Assistance Program



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1. Introduction

This is the 16th report in our pricing series, in which we observe how green bonds perform in the primary market. This report includes green bonds priced in the first six months of 2023 (H1 2023).

Our methodology is designed to capture the most liquid portion of the green bond market and is thus limited to USD and EUR bonds with a minimum original issue size of USD500m. Developed market (DM), emerging market (EM) and supranational issuers (SNAT) are included.¹ The full methodology is explained on page 21.

By the end of H1 2023, aligned green bond volume of USD278.8bn priced in H1 had been added to the Climate Bonds Green Bond Database (GBDB), 33% more than the H2 2022 (USD209bn as of June 2023). This report covers 45% of the amount recorded in the Climate Bonds GBDB for H1 that met the above requirements, i.e., USD124.6bn split between 111 green bonds from 87 issuers, which is the largest semi-annual sample to date in terms of both the number of bonds, and volume. EUR was the dominant currency with 87 bonds amounting to EUR89.9 (USD97.3bn), while 24 qualifying USD denominated bonds had a combined issue size of USD27.4bn.

Description of sample H1 2023

Category	EUR	USD
Sovereign	4	1
SSA	19	2
Covered	11	N/A
AA	3	1
A	16	11
BBB	34	9
Total	87	24

Sovereign green bond performance is assessed separately in the Sovereign Green Bond Club section of this report. Sovereigns are subject to different pricing dynamics than bonds from other issuer types and their performance is addressed on an absolute basis. Israel's 2033 deal was priced in USD rather than its local currency (ILS) and is included in the same section.

Report highlights:

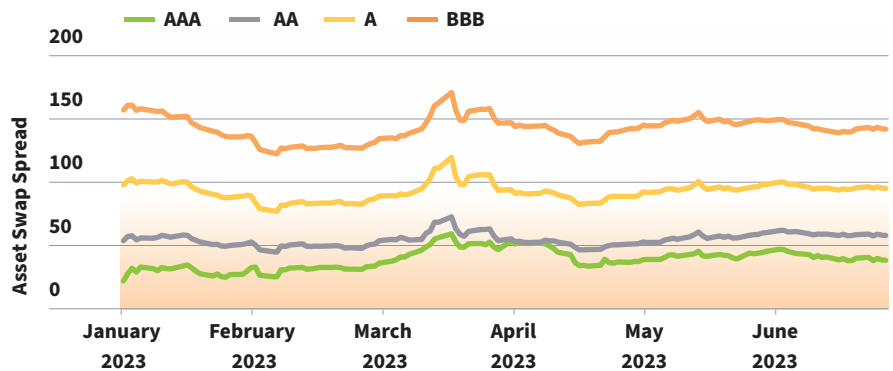
- **Overall, 66% of green bonds were allocated to investors describing themselves as having green or responsible investment mandates. See more on page 7**
- **The greenium was observed for 16 bonds in our sample See more on page 9**
- **After 7 and 28 days, green bonds had tightened by more than comparable indices, on average. See more on page 11**
- **Green bond ETFs: total fund assets in EUR and USD green bond ETFs ended the period at almost USD3bn, a net increase of 20% on the prior period. See more on page 15**
- **Sovereign Green Bond Club: Austria, Germany, and Italy returned to the market with new bonds while Israel priced its debut green bond. See more on page 16**
- **Spotlight: Quality discernment in the SLB market – Is there a link between materiality of KPIs and primary market pricing dynamics? See more on page 18**
- **Green bonds achieved higher book cover and spread compression than vanilla equivalents, on average. See more on page 4**

Market developments

Market sentiment was positive at the beginning of 2023 following a subdued fourth quarter but stuttered in March as the collapse of Silicon Valley Bank (SVB) sparked concern about broader contagion in the banking industry. Q1 saw strong volume, in both EUR and USD, as issuers were prompted to secure their annual funding requirements ahead of further interest rate hikes demanded by the stubborn inflationary backdrop. The collapse of Silicon Valley Bank (SVB) on 10 March paralysed the USD new issue market, followed by the EUR market as the implosion and subsequent rescue of Credit Suisse unfolded. However, the market was open again by the end of March, and a handful of EUR issuers such as Volkswagen (VW 2026 and VW 2029), Ahold (Ahold 2028), Stadshypotek AB (Stadshypotek 2028 (CO)), and Siemens Energy Finance (Siemens 2026 and Siemens 2029) were able to leverage the green label to get deals done, with some obtaining strong pricing dynamics in the primary market.

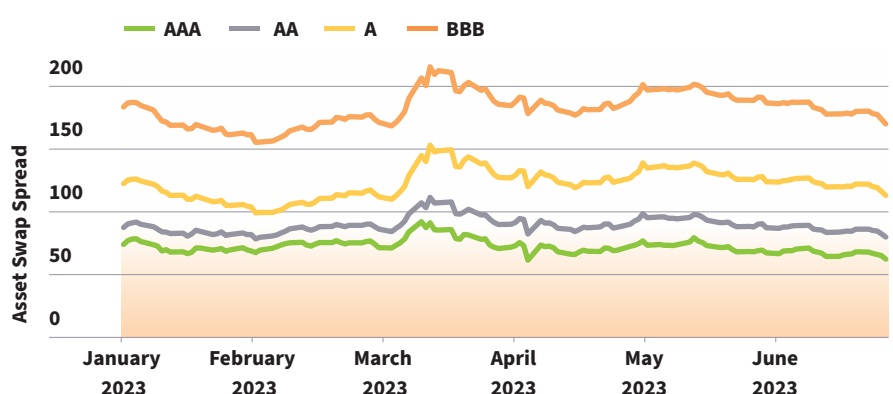
This impacted USD corporate credit spreads, which had started the year by trending downwards in response to strong demand but changed course in early February as equity valuations stumbled and credit concerns started to materialise, reaching their highs on 15 March.

EUR Corporate Credit Spreads



Source: Refinitiv

USD Corporate Credit Spreads

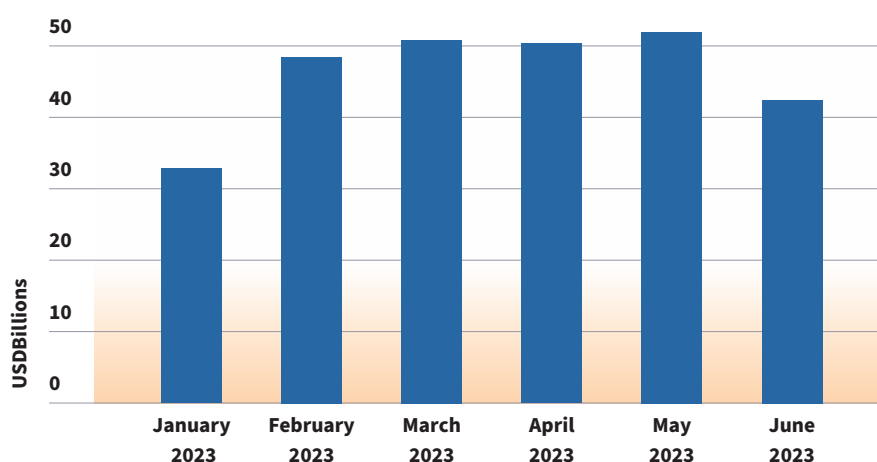


Source: Refinitiv

They slowly retracted to end H1 at tighter levels than those observed in January: AAA -13%, AA -6%, A -6%, and BBB -5%. In the EUR market, the peak came a bit later around 20 March, and at the end of June, spreads of higher credit quality corporates were wider compared to the start of the year with AAA and AA at +49% and +6% respectively. A and BBB spreads ended June 2% and 8% tighter compared to the start of the year suggesting increased risk appetite.

The volume of aligned green bonds recorded in Climate Bonds GBDB in H1 2023 reached USD278.8bn, a 33% increase compared to the USD209bn logged in H2 2022. Aligned green bonds with volume of at least USD50bn were priced in March and April, peaking at USD52bn in May, bolstered by sovereign issuance.

May was the most prolific month for aligned green bonds



Source: Climate Bonds GBDB

Green Bonds Captured by Climate Bonds

Bonds meeting the requirements outlined in Climate Bonds screening methodology qualify for inclusion in the datasets and are classified as aligned. Labelled bonds for which there is not enough information to determine eligibility for database inclusion are

classified as pending until sufficient disclosure is available to decide. Bonds failing to meet the requirements of Climate Bonds screening methodology are classified as non-aligned and are excluded from the datasets.

Green bonds captured by Climate Bonds

	Aligned	Pending	Non-Aligned	Totals
Cumulative as of 30/6/2023	USD2.5tn	USD62bn	USD425bn	USD3tn
H1 2023	USD279bn	USD54bn	USD56bn	USD389bn
H1 2023 EUR+USD	USD199bn	USD36bn	USD23.2bn	USD258.2bn

Remarks:

- Selecting bonds for vanilla baskets was very challenging for bonds priced in Q1 because of the extreme market volatility. Best efforts were applied to finding closest matches within the three-month window.
- Seniority rankings of financial corporate bonds are denoted using the following abbreviations: Senior Preferred (SP), Senior Non-Preferred (SNP) and Covered (CO). As per our standard methodology, the payment rank of the green bond is matched when selecting vanilla bonds with which to compare the performance.
- The methodology for the selection of the bonds included in vanilla baskets is given on page 21.

2. Spread compression and book size: green bonds in both EUR and USD attracted larger book cover and exhibited larger spread compression than vanilla equivalents, on average

• **EUR:** Average oversubscription was 3.2 times for green bonds versus 2.7 times for vanilla equivalents. Spread compression averaged 18bps for green bonds and 17bps for vanilla bonds.

• **USD:** Average oversubscription was 5.4 times for green bonds and 2.4 times for vanilla equivalents. Spread compression averaged 29bps for green bonds and 23bps for vanilla bonds.

EUR Book cover				
Category	Green bond sample	Number of green bonds beating vanilla basket	Green average book cover	Vanilla basket average book cover
SSA	18	13	4.4	3.0
Covered	11	8	2.7	1.9
AA	3	2	2.3	2.1
A	16	9	2.5	2.2
BBB	33	19	3.1	3.0
Total	81	51.0		

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	6.4	3.0
AA	1	1	5.8	1.9
A	9	6	5.4	2.2
BBB	7	4	5.2	2.7
Total	18	12.0		

Five EUR green bonds achieving largest book cover					
Category	Short Name	Deal size EURbn	Reported order book EURbn	Book cover	Vanilla basket book cover
SSA	KfW 2033	3.2	34.0	11.3	3.2
SSA	ICO 2027	0.5	4.5	9.0	2.8
SSA	Ile de France Mob. 2038	0.5	4.5	9.0	3.8
SSA	BADWUR 2033	0.7	4.9	8.2	4.0
Covered	DZ HYP 2026 (CO)	0.5	4.0	8.0	3.5

Five USD green bonds achieving largest book cover					
Category	Short Name	Deal size USDbn	Reported order book USDbn	Book cover	Vanilla basket book cover
A	Norinchukin Bank 2028	0.5	5	10.0	1.7
A	Gaci 2030	1.8	15.2	8.7	2.0
A	SMTB 2028	0.5	4.2	8.4	1.8
BBB	Alexandria Real Estate 2035	0.5	4.4	8.8	1.8
BBB	SK Hynix (2033)	0.8	5.8	7.7	2.9

Green bonds are oversubscribed, and demonstrate spread tightening during the pricing process, as do vanilla bonds. To help determine whether investors attach any value to the green label, green bonds are compared to carefully selected vanilla equivalents (baskets).

EUR green bond pricing

EUR green bonds attracted slightly lower order book cover in H1 2023 (3.2 times) compared to H2 2022 (3.6 times). Vanilla bonds also experienced diminished appetite, recording average book cover of 2.7 times in H1 compared to three times in H2. Spread compression during book building also dropped compared to the prior period at 18.3bps against 21bps for green bonds, and 17bps against 19bps for vanilla bonds. This appears to reflect the more plentiful supply of large green bonds in H1.

While the oversubscription rates were slightly lower in H1 compared to the prior period,

individually, 65% of EUR green bonds achieved larger book cover than vanilla equivalents (51 out of 79). This is a larger proportion than the prior three observations when the percentage has remained around the 56% level.

Meanwhile, 56% of green bonds (43 out of 77) managed larger spread compression than their vanilla counterparts, which is slightly lower than the 59% observed during the prior period.

Bonds in the sample excluded from this analysis:

Book cover: Soc du Grand Paris 2043 achieved 3.5 times book cover, the same as its vanilla basket. Ahlold 2028 achieved book cover of 5.6 times, but there was no data for its vanilla basket.

Primary market spread compression: Kunta 2028 (2bps), Neste 2029 (37.5bps), Neste 2033 (29.5bps), Intesa SP 2030 (SP) (25bps), Johnson Controls 2035 (27bps), and KfW 2030 (2bps) all achieved the same spread compression as their vanilla baskets.

Book cover

Among the five EUR green deals with the largest book cover were four deals from SSA issuers and one covered bond. This increased appetite for deals from higher quality issuers is a predictable result of rising rates, deteriorating credit quality, volatility, and anxiety caused by the collapse of SVB and Credit Suisse.

The two EUR deals achieving the largest book cover were priced on the same day in early February when the new issuance market was buoyant and reports of credit deterioration and downwards earning trends in equity markets began to emerge. German state-owned development bank KfW is a regular issuer of large green bonds and has consistently achieved strong pricing metrics in the EUR primary market. KfW priced two EUR3bn (USD3.2bn) bonds in H1 2023: a 2033 in February, and a 2030 in May. The order book for **KfW 2033** reached EUR34bn, translating into book cover of 11.3 times which was the largest among the EUR green bond sample.

Climate Bonds has only recorded one EUR SSA green deal with larger book cover and one that matched it, both priced in Q2 2022 (EU 2043, 13 times, and KfW 2032 11.3 times).

Spanish state finance agency Instituto de Credito Oficial (ICO) has issued one green bond annually since 2019. Its **ICO 2027** EUR500m (USD560m) attracted book cover of nine times.

Since 2021, Ile-de-France Mobilités (Ile de France Mob.) has priced eight green bonds with proceeds earmarked for Low-Carbon Transport. The most recent deal was priced in June and the EUR500m (USD536m) **Ile de France Mob. 2038** was also covered nine times. The authority is responsible for the development of public passenger transport services within the region of Île-de-France which includes Paris.

BADWUR 2033 managed the fourth of the top five largest book covers reaching 8.2 times its EUR600m (USD656m) deal size. The German State of Baden Wurttemberg is rich in natural biodiversity and includes the Black Forest National Park. Proceeds from the deal, and those of its two predecessors, are earmarked to support Low-Carbon Energy, IT, and Land Use.

DZHYP 2026 (CO) was the only non-SSA deal in the top five and was oversubscribed by eight times in the primary market. The EUR500m (USD541m) deal was priced in January together with the longer maturity **DZHYP 2032 (CO)** of the same size, which achieved book cover of only 2.6 times, suggesting investor preference for shorter duration assets in a rising rate environment.

Spread compression

The five bonds exhibiting the largest spread compressions in EUR were all from private sector issuers, which occurred in the prior observation period. This is unsurprising given that bonds with relatively lower credit quality tend to price wider, hence the absolute levels of spread tightening are larger.

The debut green bond from French **Banque Stellantis 2026 (SP)** scored 50bps of spread tightening in the primary market, then

tightened more than comparable baskets and corresponding indices after both seven and 28 days. The proceeds were earmarked for refinancing loans and leases for passenger and light commercial vehicles compatible with Low-Carbon Transport. The deal was priced in early January on a day which Bloomberg described as the second busiest day on record for the European debt new issue market, with volume reaching EUR39bn.² Since 2016, Climate Bonds has observed spread compression of at least 50bp for just nine EUR bonds, so the magnitude of this tightening is very unusual. **Prologis 2032** reached the zenith of 65bps with its June 2020 deal.

Four deals exhibited spread compression of 40bps, all from entities operating in the utility sector. This is one of the easiest sectors to decarbonise because the transition pathways are clear, and clean alternatives comprise tested and scalable technology. Low-Carbon Energy is also one of the most important UoP categories to scale up because it is a contingency for the decarbonisation of most other sectors.

German energy supplier E.ON priced its tenth aligned green bond in January, together with a shorter vanilla deal. The **E.ON 2034** EUR1bn (USD1.1bn) green tranche attracted book cover of 4.2 times. E.ON's 2021 updated green bond framework complies with the EU Green Bond Standard (GBS) and references the EU Taxonomy, and proceeds from the bond were earmarked for projects in Low-Carbon Energy, Energy Efficiency, and Low-Carbon Transport.

Belgian grid transmission system operator Elia priced its debut green bond in January. The **Elia 2034** EUR500m (USD540m) achieved an order book of 5.2 times and received strong support from green investors. The **Enexis 2034** was priced in June and was the third aligned green bond from the Dutch regional grid operator. Most of the proceeds were earmarked for Low-Carbon Energy, with a smaller share going towards Low-Carbon Buildings.

Energias de Portugal's (EDP) **EDP 2028** was the fourth bond to obtain spread compression

of 40bp in the primary market. The EUR750m (USD823m) deal was priced in the busy last week of June attracting book cover of 6.1 times. Climate Bonds has included five other EUR deals from EDP in semi-annual pricing studies. All of them have achieved a larger magnitude of spread compression than vanilla baskets (average spread compression of 36.5bps), and all except one have attracted larger book cover (average book cover of 6.1 times). All have also outperformed vanilla baskets and matched indices in the secondary markets after both seven and 28 days. EDP's energy sector decarbonisation goals have been approved by the Science Based Targets initiative (SBTi) to reach net zero by 2040.

USD green bond pricing

USD green bonds achieved higher book cover and more aggressive tightening than vanilla bonds, on average. The H1 2023 sample obtained an average book cover of 5.4 times, slightly more than the five times observed in H2 2022, while vanilla bonds book cover declined to 2.4 times from three times in the prior period.

Spread compression was also more aggressive for green bonds at 29bps against 23bps for the vanilla sample. These numbers were both larger than the H2 sample, which exhibited 25bps and 18bps of tightening for the green and vanilla samples respectively.

Twelve out of 18 green bonds (67%) achieved larger book cover than vanilla counterparts. Thirteen out of 22 green bonds (59%) experienced more spread compression compared to equivalents. These percentages were lower than those recorded for H2 2022, which were 79% and 85% respectively.

Bonds in the sample excluded from this analysis:

Book cover: No order book data was available for ICBAS (HK) 2026, EIB 2033, Saudi Elec. 2033, Boston Properties 2034, or AES 2028.

Spread compression: No data was available for Saudi Elec. 2033.

EUR Spread compression (swap spreads)

Category	Green bond sample	Number of green bonds beating vanilla equivalent	Green average spread compression	Vanilla basket average spread compression
SSA	17	12	-3.1	-1.9
Covered	11	7	-4.2	-2.9
AA	3	2	-23.3	-21.7
A	14	6	-25.6	-23.3
BBB	32	16	-27.5	-26.6
Total	77	43		

USD spread compression (treasury spreads)

Category	Green bond sample	Number of green bonds beating vanilla equivalent	Green average spread compression	Vanilla basket average spread compression
SSA	2	0	-17.9	-20.5
AA	1	0	0.0	-15.0
A	10	8	-32.8	-22.6
BBB	9	5	-30.3	-25.0
Total	22	13		

Book cover

Four of the bonds achieving the largest order books in the USD green bond market were financial corporates, and only one of the issuers was a US entity. Prior to H1 2023, Climate Bonds had only recorded seven USD green bonds covering their order books by at least eight times. The largest of those was the Mexico City Airport 2026 transaction (later removed from the dataset) priced in 2016.

This was matched by Japanese cooperative bank Norinchukin which priced its fourth aligned green bond in June. The issuer remarked that the USD500m **Norinchuckin Bank 2028** had received robust demand despite the volatile market conditions. The proceeds were earmarked for projects in Low-Carbon Energy, Low-Carbon Buildings and Low-Carbon Transport

Alexandria RE 2035 accumulated book cover of 8.8 times when it was priced in early February. The USD500m bond was the fifth aligned deal from the California based real estate company with a focus on the ownership, development, and operation of life science campuses.

Saudi Arabia's sovereign wealth fund, the Public Investment Fund (PIF), returned to the green bond market in February for the second time in four months with a three-tranche deal. **Gaci 2030**, the shortest dated of those, attracted book cover of 8.7 times. Climate Bonds expects more green bonds from this issuer which has committed to USD10bn of investment in renewable energy projects by 2026.

SMTB 2028 covered its USD500m early March transaction 8.4 times. Proceeds from the deal were earmarked for wind and solar projects included in the category of Low-Carbon Energy.

Korean chip supplier **SK Hynix 2033** attracted an order book of 7.7 times for its USD750m January deal. The entity is the world's second largest manufacturer of memory chips, and the third largest of semiconductors. Proceeds from the deal were earmarked for Water, Energy Efficiency, Waste, and Land Use. SK Hynix was the only entity in the H1 sample operating in the technology sector and the opportunity to diversify could have heightened the interest.

Spread compression

SK Hynix 2033 exhibited the largest spread compression in the USD sample in H1. Climate Bonds historical sample includes one deal with 55bps (Mexico City Airport 2046, priced in 2016 and later removed), and one other obtaining 50bp, Avangrid 2025 priced in 2020. As mentioned above, the relative scarcity of green deals originating from the technology sector would have contributed to investor interest in this deal.

ICBAS (HK) 2026 tightened by 49bps during book building. The same issuer priced the ICBCAS (HK) 2025 in 2022 which tightened by 47bps in primary. Proceeds from the most recent deal were earmarked for Low-Carbon Energy, Low-Carbon Transport, and Waste.

China Construction Bank issued its sixth aligned green bond in May. The **CCB (Sydney) 2026** USD500m deal tightened by 40bps in primary. Proceeds were earmarked for biodiversity, forest management and land restoration projects, all falling into the Land Use category. Climate Bonds historical pricing dataset confirms that shorter dated USD green bonds from Chinese banks and their subsidiaries tend to achieve good pricing metrics during book building.

Rec Ltd is an Indian government-owned company providing financial and technical support for rural electrification projects in India. Its **REC 2028** USD750m deal tightened by 37.5bps during book building when it was announced in April. Proceeds from this deal were earmarked for Low-Carbon Transport. There is much work to do in India which must combine economic growth with decarbonisation to achieve its commitment to net zero by 2070. The government began issuing local currency sovereign green bonds in early 2023. However, large USD denominated deals such as this one offer international investors the opportunity to support development in this critical emerging economy without exposing themselves to currency risk.

Public Service Electric and Gas Co. is a US based diversified energy company. Its USD500m **PEG 2033 (SS)** priced in late March as markets were reopening. The 36bps of spread tightening contributed to almost 50% of attrition in the order book but the reconciled order book still covered the deal by 3.5 times. Proceeds were allocated to Low-Carbon Energy, Low-Carbon Transport, and Adaptation and Resilience.

Methodology notes: Baskets comprise bonds that most closely match the green bonds and are issued during the same quarter. The baskets in this publication include between one and seven bonds. For an explanation of the methodology, see page 21.

Five EUR green bonds achieving largest spread compression (swap spreads)

Category	Bond	Pricing date	IPT	Primary Spread	Compression green bond	Compression vanilla basket
A	Enexis 2034	05/06/2023	105	65	-40	-24
BBB	Banque Stellantis 2026 (SP)	10/01/2023	135	85	-50	-25
BBB	E.ON 2034	05/01/2023	140	100	-40	-28
BBB	Elia 2033	11/01/2023	125	85	-40	-30
BBB	EDP 2028	19/06/2023	105	65	-40	-35

Five USD green bonds achieving largest spread compression (treasury spreads)

Category	Bond	Pricing date	IPT	Primary Spread	Compression green bond	Compression vanilla basket
A	ICBCAS (HK) 2026	11/01/2023	110	61	-49.0	-43.0
A	CCB (Sydney) 2026	23/05/2023	95	55	-40	-20.00
A	PEG 2033 (SS)	23/03/2023	158	122	-36.0	-20.0
BBB	SK Hynix (2033)	10/01/2023	360	310	-50.0	-25.0
BBB	REC 2028	03/04/2023	250	212.5	-37.5	-40.00

3. Green allocations: 66% allocated to investors describing themselves as green

Climate Bonds invited the 83 non-sovereign issuers included in this analysis to disclose what percentage of their deal was allocated to investors describing themselves as green or socially responsible (green investors). The results of this outreach were as follows:

- 42 issuers representing 53 bonds shared the data
- 12 issuers representing 18 bonds replied without disclosing the data
- 29 issuers representing 34 bonds did not reply

Based on these responses, the average allocation to investors describing themselves as green was found to be 66%. This appears to have stabilised over the past few observation periods, as the number has remained within a 2% band throughout 2021 and 2022.

Allocations ranged from 100% (Soc. Du Grand Paris 2053) to 15% (Siemens 2026 and 2029).

Engagement with USD issuers improved with six replies to the request for numbers, and two more representing four deals who replied but could not disclose. Twelve did not acknowledge the request. Nine of the USD deals originate from the USA or Europe, with the remaining 14 originating from ASEAN or the Middle East, and a lack of contact information or language barriers contribute to the challenges of gathering this data. It is hard to draw conclusions from the persistently small USD dataset, but those who replied were as always positive on the benefits of the green label.

Examples of investor type category descriptions

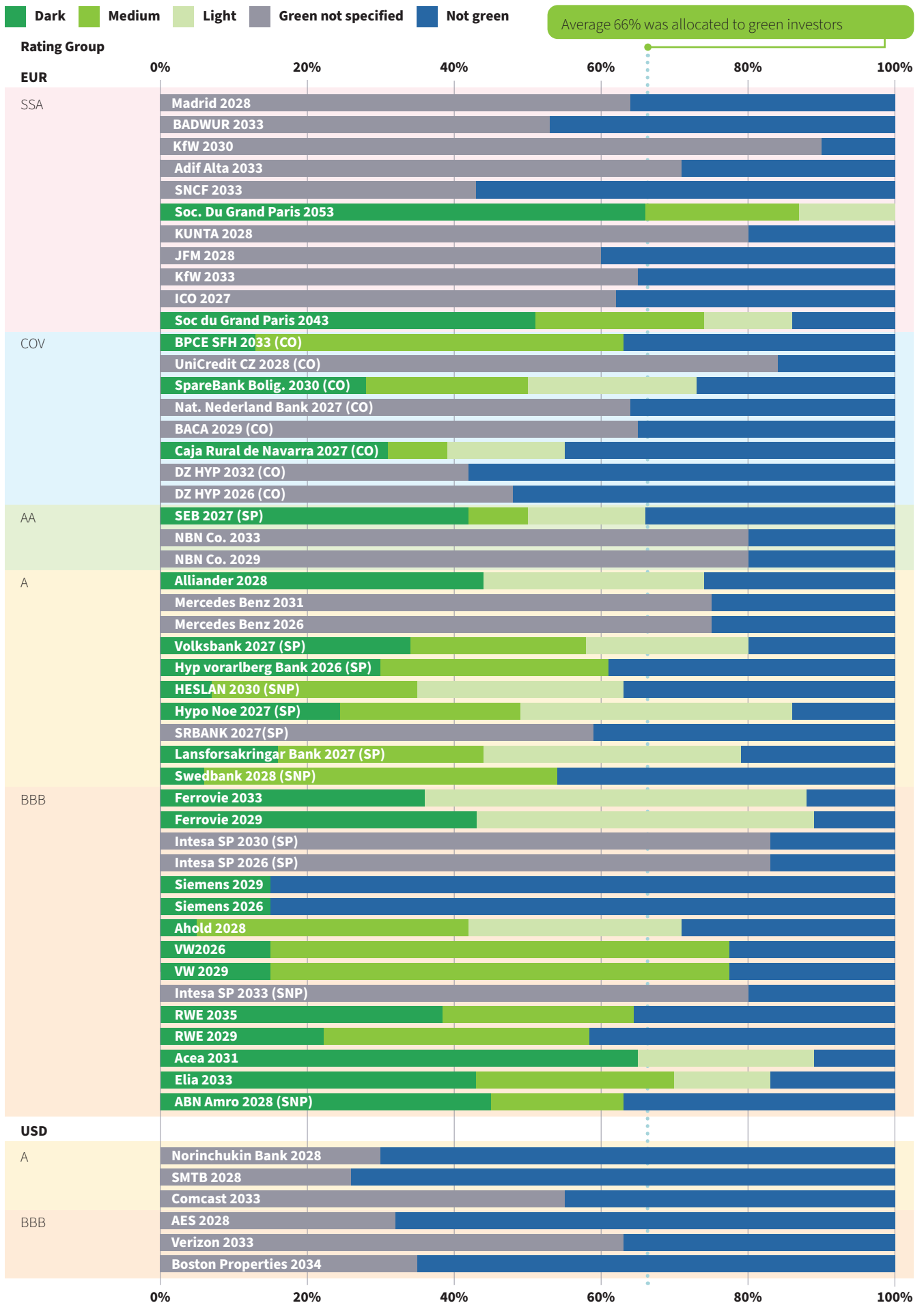
Dark green	Medium green	Light green
Article 9	Strong ESG commitment	PRI signatory
Dedicated	ESG integration	Exclusions
Advanced green	Engaged investors with ESG teams	Committed to at least one UN-lead initiative e.g., PRI, PSI, PRB
Impact oriented strategies	Best in class funds	

Among the EUR issuers, 20 responsible for 25 deals provided data classified by dark green, medium green, or light green categories. These categories are defined either internally by issuers or by their brokers. Climate Bonds has recorded this for the first time so that changes can be monitored over time. The definitions of each category were understandably not the same from each source but were broadly aligned. The above table includes examples of the descriptions provided for each category.

Issuers generally acknowledge that the green label attracts a broader range of investors enabling good diversification of the investor base. Furthermore, each subsequent deal attracts a larger number of dedicated investors.

Methodology notes: Green investor participation is provided by issuers. There is no standard methodology for defining a green investor and Climate Bonds acknowledges that this is subject to interpretation. There is no way to monitor how investors split their allocations of green bonds among their different portfolios.

66% of green bonds allocated to green investors



4. Greenium

The new issue premium is the extra yield that a buyer receives and a seller pays for a new bond, compared to where seasoned bonds from the same issuer are trading in the secondary market at the time of issuance. A new issue premium is a standard feature of the bond market.

However, sometimes, a bond may be issued with a higher price, and thus have a lower yield compared to outstanding debt. The bond will price inside its own yield curve. This is known as a new issue concession; when present in a green bond, Climate Bonds has termed it **greenium**. This is an excellent outcome for any issuer because it means that it pays less to fund its green bond compared to its secondary market vanilla debt.

There is no reason why a bond being green should impact its price, since green bonds rank pari-passu (on equal footing) with bonds of the same payment rank and issuer. There is no credit enhancement to explain pricing differences and issuers of green bonds often incur costs such as Second Party Opinions and Certification, although these are typically negligible.

Pricing outcomes	EUR		USD		Total
	Q1	Q2	Q1	Q2	
Greenium	6	6	2	2	16
New issue premium	18	10	2	4	34
Sum	24	16	4	6	50

Green bonds exhibiting a greenium in H1 2023

EUR	USD
DZ HYP 2026 (CO)	ICBCAS (HK) 2026
BACA 2029 (CO)	Comcast 2033
JFM 2028	Saudi Elec. 2033
KUNTA 2028	AES 2028
Nat. Nederland Bank 2027 (CO)	
Stadshypotek AB 2028 (CO)	
Ned. Water. 2033	
SpareBank Bolig. 2030 (CO)	
KfW 2030	
NRW 2030	
LBBW 2027 (CO)	
Madrid 2028	

Kunta 2028

Kuntarahoitus Oyj (Kunta) is a Finnish, public sector owned institution lending to municipalities to finance sustainable development. This lending is financed in the capital markets. Kunta's objectives are aligned with those of the Finnish government, aiming for both carbon neutrality by 2035 and the protection of biodiversity, and financed emissions are calculated and monitored. Kunta updated its Green Bond Framework in August 2022, referencing both the EU Taxonomy and the EU GBS. Eligible project categories were stated as Low-Carbon Buildings, Low-Carbon Transport, Low-Carbon Energy, and Water and Waste.

Kunta initiated its green bond programme in 2016 and has priced eight aligned deals to date. The most recent of these was the Kunta

2028 priced in mid-February. The EUR1bn (USD1.1bn) bond covered its book twice compared to its vanilla basket which managed 1.2 times. Both the Kunta 2028 and its vanilla basket tightened by 2bps during book building, and the Kunta 2028 priced inside its secondary market yield curve. The order book was well diversified geographically and by investor type, and 80% of the deal was allocated to investors describing themselves as green.

The deal priced at mid-swaps -3bps but secondary market performance was impacted by the collapse of SVB and associated market turmoil, and the spread moved in a range of between -8.9bps and 3.4bps. However, by the end of June, the bond was at mid swaps -2.8bps.³

KUNTA 2028 exhibited a greenium



Green bonds and vanilla equivalents are subject to the same market dynamics such as supply, rate expectations and geopolitical crises.

EUR investors willing to pay for green deals from SSA and covered bond issuers

In H1 2023, Climate Bonds built yield curves for 50 non-sovereign bonds out of a sample of 106.

Within our sample of 50 green bonds, 16 priced on or inside their own secondary market yield curves (32%).

Twelve bonds obtaining a greenium were EUR denominated, while four were priced in USD. Among the EUR deals, five were covered bonds and seven were SSA. This is consistent with the increased interest observed for green bonds from such issuers during book building.

The USD bonds were from the private sector, but there are not enough data points to draw any conclusions.

A third of green bonds achieving a greenium is consistent with the historical average observed by Climate Bonds since H2 2016. SSA and Covered Bonds achieving strong pricing dynamics is to be expected given the landscape in H1 2023. The green label offers extra appeal, firstly because of the dedicated investor base, and secondly because of the liquidity it offers to investors who may later decide to sell. Such flexibility is priceless in uncertain markets, which is one reason why the green bond market remains undersupplied. Climate Bonds expects this dynamic to continue for the foreseeable future, as more investors, particularly in Europe, commit to investments that support decarbonisation efforts.

Climate Bonds continues to receive various inquiries on the topic of greenium calculations. The box below is reprinted from the H1 2022 iteration of this report.

When is a greenium not a greenium

Climate Bonds uses the term greenium when a bond is sold in the primary market with a higher price – and corresponding lower yield – compared to where existing debt of the same issuer is trading in the secondary market. This is similar to what is described as a new issue concession. Climate Bonds uses this data as a proxy to determine whether the green label can achieve cheaper funding for the issuer.

There is nuance to this: for example, even if a green bond does not price through its own yield curve and delivers a traditional new issue premium, the issuer could still have achieved cheaper funding that it would have, had it issued a vanilla bond. Climate Bonds does not remark on this for now.

Since Climate Bonds introduced the term greenium in 2017, it has been incorporated into the financial vernacular. The term has been used to describe a multitude of calculations related to

green bond pricing. These include secondary market performance, or comparisons of new issue spreads of green bonds and other bonds issued in different years from the green bond for example, which would naturally result in vastly different conclusions.

Even when the term greenium is used as a proxy for new issue concession by others, there are some details which may give different results from those achieved by Climate Bonds.

- Climate Bonds uses Bloomberg closing prices.
- For large government bonds, Climate Bonds confers with the issuer to determine the precise timing of the deal to ensure that a yield curve is built using data from the exact same time. Where possible, official pricing sources are used.
- Climate Bonds plots the duration on the x-axis, not the maturity. Using the duration accounts for differences in coupon and pricing dates across the yield curve.

- Climate Bonds uses a homogenous set of bonds. Only bonds sharing the same characteristics as the green bond are included in the construction of the yield curve (for example, minimum size of USD500m, bonds of the same seniority, etc.). Bonds bearing other thematic labels are excluded or plotted as a separate curve.
- Climate Bonds does not account for a vanilla bond new issue premium equivalent in its greenium calculations. Climate Bonds determines the greenium through linear interpolation according to the position of the bonds on either side of the green bond's duration at the time of the green bond's pricing.

Stadshypobank 2028 (CO)

Stadshypotek AB is the mortgage subsidiary of Swedish bank Svenska Handelsbanken. Stadshypotek AB issues under the SHBASS ticker from which Climate Bonds has recorded six aligned green deals to date. Handelsbanken's green bond framework, which was updated in August 2022, acknowledges the EU GBS and references the six environmental objectives of the EU Taxonomy. The framework names eight eligible project categories: Low-Carbon Transport, Adaptation, Energy Efficiency, Land Use, Pollution Prevention and Control, Low-Carbon Energy, and Water and Wastewater. Handelsbanken's own operations have been net-zero since 2017, and it has committed to fully decarbonising by 2040 at the latest.

Stadshypotek 2028 (CO) was the first EUR covered bond from the issuer and was priced in late March as the new issue market started to reopen post SVB. The EUR1bn (USD1.1bn) deal accumulated book cover of 2.25 times, beating its vanilla basket (1.6 times), and the spread tightened by 4bps compared to 3bps for its comparable. The bond landed at mid-swaps +16bps, which was inside its secondary market yield curve, delivering a greenium, and it continued to tighten in the secondary market. After both seven and 28 days, the bond had tightened by a larger magnitude than its vanilla basket and corresponding index.

Stadshypotek 2028 (CO) exhibited greenium



Methodology notes: We use yield-on-issue-date, which reflects the price that the green bond offered on the pricing date. For comparable bonds, we use the yield-to-convention-mid.

For all bonds, we use modified-duration-to-mid, and all the data is as of the pricing date of the green bond. The modified duration is the percentage price change of a security for a given change in yield. The higher the modified duration, the more sensitive the bond's price is to interest rate movements.

First, we plot seasoned vanilla bonds (blue dots) and fit a 2nd order polynomial yield curve. Next, we overlay any seasoned green bonds (orange), and finally we add our subject bonds (green). Vanilla bonds issued on the same day as the subject green bond are also included (grey). We include the yield curves of bonds in our sample with a minimum of two comparable bonds (one with a shorter duration, and one with a longer duration than the green bond).

Comparable bonds used for this exercise must fit the specification for green bond selection outlined on page 21, except that they are not labelled and the UoP is not limited. Bonds must share the same credit rating and payment rank as the green bond and have been issued on or after 1 January 2014.

5. Performance in the immediate secondary market

• **Seven days after pricing**, 49% of green bonds had tightened more than comparable vanilla baskets; 69% had tightened more than their corresponding index.

• **28 days after pricing**, 49% of green bonds had tightened more than comparable vanilla baskets; 67% had tightened more than their corresponding index.

In H1 2023, 77% of green bonds in our sample exhibited tighter spreads seven days after their pricing date. This declined slightly to 71% after 28 days. In the prior observation period, 67% of deals had tightened after seven days, and 73% had after 28 days.

Rating Group	Bond	1 week change			28 day change		
		Green Bond	Vanilla Basket	Corresponding iBoxx index	Green Bond	Vanilla Basket	Corresponding iBoxx index
EUR SSA	NIB 2030	18.6%	14.2%	-89.1%	-90.5%	1.3%	-13.0%
	Ile de France Mob. 2033	-22%	-55%	-7%	6%	-11%	-21%
	Ile de France Mob. 2043	2%	-1%	-1%	3%	-6%	-40%
	ICO 2027	-43.6%	-8.3%	1.4%	-9.3%	7.5%	18.0%
	KfW 2033	-165.3%	-133.3%	82.7%	109.9%	-0.7%	1.6%
	EIB 2028	-82.6%	-39.0%	-3.2%	17.9%	-5.6%	10.9%
	JFM 2028	-1.3%	12.7%	-4.8%	14.1%	-1.2%	43.8%
	KUNTA 2028	42.0%	213.0%	42.3%	12.0%	-1.0%	20.7%
	Soc. Du Grand Paris 2053	4.4%	1.2%	-12.7%	-21.2%	-0.1%	-1.3%
	Ned. Water. 2033	-5%	2%	-7%	13%	-0.75%	14.59%
	SNCF 2033	-23.20%	-26%	-3%	-2%	0.36%	13.08%
	Adif Alta 2033	-10%	-8%	-3%	-2%	6.71%	10.33%
	Ferrovie 2033	-8%	-9%	-3%	-2%	-0.98%	-9.84%
	KfW 2030	-4%	24%	-57%	36%	-1.25%	0.64%
	NRW 2030	-19%	74%	-22%	31%	5.00%	5.49%
	EIB Korea 2030	-5.9%	-6.9%	-5.4%	20.4%	2.7%	-9.0%
	Ile de France Mob. 2038	-8.4%	-12.5%	-7.9%	-6.4%	-0.6%	-2.9%
	BADWUR 2033	37.0%	-17.0%	-3.1%	-2.0%	-7.2%	-5.7%
Madrid 2028	5.5%	6.4%	0.7%	-12.8%	-9.5%	-9.9%	
Covered	DZ HYP 2026 (CO)	-97.0%	-130.3%	118.0%	497.0%	3.5%	-4.4%
	DZ HYP 2032 (CO)	-4.9%	-5.5%	-2.2%	-1.3%	3.2%	-3.2%
	Caja Rural de Navarra 2027 (CO)	-16.9%	-13.2%	-3.9%	-9.5%	1.9%	-9.9%
	BACA 2029 (CO)	-9.8%	-13.2%	-0.5%	-1.4%	-2.5%	-0.2%
	Nat. Nederland Bank 2027 (CO)	-21.8%	-13.8%	-23.8%	-22.7%	-0.2%	7.4%
	Stadshypotek 2028 (CO)	-9.5%	-10.6%	-1.3%	-6.4%	-3.5%	1.0%
	SpareBank Bolig. 2030 (CO)	16%	-4%	-5%	-11%	-3.11%	-2.18%
	Arkea 2033 (CO)	1.8%	7.0%	-1.2%	5.5%	-1.9%	-0.2%
	UniCredit CZ 2028 (CO)	-21.8%	-22.4%	-1.5%	-2.4%	2.6%	0.5%
	BPCE SFH 2033 (CO)	-3.0%	-6.7%	-1.2%	5.5%	1.4%	-0.7%
LBBW 2027 (CO)	104.0%	168.0%	15.3%	28.4%	1.5%	-0.4%	
AA	NBN Co. 2029	-44.2%	-14.6%	4.7%	-2.5%	-0.1%	-0.6%
	NBN Co. 2033	-13.6%	-11.9%	-9.5%	10.9%	-4.7%	-5.7%
	SEB 2027 (SP)	-5.2%	-22.8%	4.0%	0.7%	1.6%	-7.7%
A	Swedbank 2028 (SNP)	-5.5%	-16.8%	-3.1%	-5.6%	-1.1%	-13.8%
	Lansforsakringar Bank 2027 (SP)	-9.5%	-24.6%	-13.4%	-19.9%	-6.4%	-22.4%
	SRBANK 2027(SP)	-8.9%	-14.8%	-13.4%	-19.9%	-12.6%	-21.3%
	Hypo Noe 2027 (SP)	-3.1%	0.5%	-13.4%	-19.9%	-4.8%	-10.5%
	HESLAN 2030 (SNP)	-14.8%	-0.6%	-1.8%	-10.8%	-1.6%	-17.1%
	Hyp Vorarlberg Bank 2026 (SP)	-11.8%	-14.9%	-18.1%	-27.2%	13.7%	23.6%
	Volksbank 2027 (SP)	-1.5%	35.2%	-13.4%	-19.9%	15.4%	7.4%

Continued		1 week change			28 day change		
Rating Group	Bond	Green Bond	Vanilla Basket	Corresponding iBoxx index	Green Bond	Vanilla Basket	Corresponding iBoxx index
EUR A	Neste 2029	7.2%	-6.2%	-1.6%	-23.1%	19.0%	0.0%
	Neste 2033	-2.0%	-5.9%	-4.1%	0.0%	13.2%	-1.6%
	Mercedes Benz 2026	-8%	4.4%	-12%	6%	2.41%	3.93%
	Mercedes Benz 2031	-17%	-17%	-2%	2%	-0.89%	-1.20%
	Statnett 2033	-4.6%	-10.8%	-5.9%	-5.9%	-0.3%	-1.1%
	Statkraft 2033	-0.5%	-11.1%	-5.9%	-5.9%	-0.5%	-1.1%
	BoA 2028	-1.5%	-2.4%	-9.7%	-16.0%	-3.7%	-6.4%
	Enexis 2034	-6.6%	-10.9%	-16.8%	-21.7%	-3.2%	-2.6%
	Alliander 2028	10.5%	-24.6%	8.9%	10.6%	-6.7%	-9.0%
BBB	E.ON 2034	5.4%	-2.9%	-5.0%	-12.2%	-0.3%	-7.5%
	ABN Amro 2028 (SNP)	-3.0%	-25.9%	-17.2%	-28.8%	-3.1%	-23.8%
	National Grid 2029	-6.5%	-9.6%	-6.4%	-16.9%	-2.9%	-16.8%
	Banque Stellantis 2026 (SP)	-20.8%	-63.4%	-18.1%	-27.2%	-6.1%	-29.9%
	Elia 2033	-6.3%	-8.9%	-17.4%	-19.9%	-3.8%	-14.4%
	Thames Water 2027 (SS)	-5.9%	-24.6%	-4.7%	-32.0%	-6.3%	-21.5%
	Thames Water 2031 (SS)	-3.6%	-5.6%	-17.4%	-19.9%	-3.8%	-14.4%
	Acea 2031	-13.3%	-25.9%	-17.4%	-19.9%	-5.8%	-12.2%
	RWE 2029	2.4%	3.8%	-15.6%	-23.8%	4.1%	7.6%
	RWE 2035	-0.6%	0.9%	-5.0%	-12.2%	3.6%	8.2%
	Orsted 2026	-42.4%	-20.7%	-4.7%	-32.0%	0.3%	24.3%
	Orsted 2030	-13.6%	-18.2%	-6.4%	-16.9%	0.3%	10.6%
	Orsted 2035	-12.8%	-16.9%	-5.0%	-12.2%	2.3%	8.9%
	Intesa SP 2033 (SNP)	-4.5%	20.8%	1.3%	-7.7%	5.5%	14.5%
	de Volksbank 2030 (SNP)	-5.2%	8.5%	-0.3%	-18.8%	2.7%	15.4%
	Stellantis 2030	11.1%	-0.9%	7.5%	3.6%	7.5%	3.6%
	Autoliv 2028	-4.7%	7.9%	-2.1%	10.0%	11.8%	10.0%
	Brambles 2031	-10.0%	-20.3%	-3.6%	-16.2%	-0.3%	-4.0%
	VW 2026	-14.6%	-21.1%	-12.5%	-26.2%	2.6%	-8.9%
	VW 2029	-6.8%	-21.0%	1.5%	3.2%	0.3%	-10.9%
	Ahold 2028	-23.7%	-27.0%	-32.5%	-38.5%	-10.1%	-14.8%
	Siemens 2026	-25.5%	-35.9%	-21.3%	-34.5%	-5.4%	-11.2%
	Acciona Energia 2030	-6%	16%	9%	7%	1.80%	10.49%
	Intesa SP 2026 (SP)	-4%	-11%	-5%	-11%	-3.11%	-2.18%
	Intesa SP 2030 (SP)	-3%	-9%	-10%	-12%	-0.02%	-3.08%
	de Volksbank 2027 (SNP)	-3%	0%	-4%	3%	-3.79%	-8.26%
	Ferrovie 2029	-11%	-5%	-18%	-18%	-1.25%	0.64%
	Johnson Controls 2035	-12%	-14%	-10%	-17%	-2.05%	-4.67%
	Stora Enso 2026	-17%	-15%	-27%	-8%	2.80%	-3.20%
	Stora Enso 2029	-10%	-11%	-9%	-13%	0.87%	-5.26%
	Renault 2028	-7.3%	-17.5%	-15.5%	-14.6%	-1.9%	-5.9%
	EDP 2028	-2.1%	-7.8%	8.9%	10.6%	-1.0%	-3.5%
Siemens 2029	-10.5%	-14.0%	-1.6%	-23.1%	-8.1%	-11.0%	

Continued		1 week change			28 day change					
Rating Group	Bond	Green Bond	Vanilla Basket	Corresponding iBoxx index	Green Bond	Vanilla Basket	Corresponding iBoxx index			
USD	SSA	EIB Korea 2033	-17.9%	-30.9%	7.5%	24.5%	7.1%	9.0%		
		EIB 2033	-18.9%	-47.6%	-19.7%	-15.8%	2.5%	-3.3%		
	AA	SK On 2026	-12.2%	-21.7%	0.1%	-32.7%	5.3%	-14.9%		
A		ICBCAS (HK) 2026	18.4%	11.0%	-19.0%	-17.5%	-3.7%	-16.8%		
		Comcast 2033	13.7%	20.1%	10.4%	4.4%	3.0%	7.8%		
		Gaci 2030	-9.8%	-14.6%	-2.3%	-11.2%	5.6%	8.4%		
		Gaci 2035	9.4%	-8.6%	-0.3%	3.4%	4.7%	5.6%		
		Gaci 2053	7.2%	6.3%	-1.2%	8.1%	4.7%	5.6%		
		SMTB 2028	-21.3%	0.8%	0.0%	-22.4%	-1.6%	28.1%		
		Norinchukin Bank 2028	-11.1%	17.3%	1.4%	8.6%	2.7%	24.1%		
		PEG 2033 (SS)	-3.4%	-13.1%	1.1%	5.0%	-8.5%	-10.1%		
		Saudi Elec. 2033	29.5%	12.3%	-27.5%	-4.6%	3.6%	3.7%		
		Pacificorp 2053	-2.5%	-1.7%	-1.3%	-7.3%	-2.1%	-3.3%		
		CCB (Sydney) 2026	6.3%	7.1%	6.1%	-28.2%	-6.5%	-7.8%		
		BBB		SK Hynix (2033)	0.6%	-18.7%	5.7%	-0.6%	-5.1%	-11.5%
				Alexandria Real Estate 2035	-2.4%	8.0%	2.8%	6.1%	4.8%	10.7%
				REC 2028	0.3%	-5.9%	-9.0%	-2.8%	1.9%	-2.4%
Boston Properties 2034	0.4%			0.0%	-3.7%	-11.9%	0.7%	-2.3%		
Verizon 2033	-6.0%			-0.1%	-3.5%	-7.2%	-0.2%	-5.7%		
AES 2028	0.3%			1.5%	-17.1%	-6.0%	-3.2%	-8.7%		
MAF 2033 (Sukuk)	0.0%			3.0%	0.4%	0.9%	-2.5%	-6.0%		
MVM Energetika 2028	-6.7%			-11.2%	-17.1%	-6.0%	-2.6%	-10.9%		
Hyundai 2025	2.2%			-17.7%	-5.4%	-5.3%	-1.8%	-5.5%		

The relatively lower number of deals beating their vanilla baskets compared to their indices is indicative of the prevailing volatile market conditions and credit events towards the end of Q1. Bonds are matched with baskets on a best-efforts basis with bonds priced in the same quarter. Where the green bonds and their baskets were not priced in the week or even on the same day, they would not necessarily have moved in the same direction in the secondary market. Bonds are compared to corresponding indices over the same period, so timing does not influence differences.

After seven days

- 49% of green bonds had tightened by more than their vanilla baskets: 49% of EUR and 48% of USD green bonds.
- 70% of green bonds had tightened by more than their corresponding index: 76% of EUR and 52% of USD green bonds.

A larger percentage of individual bonds tightened on the break in H1 2023 compared to H2 2022 (77% against 67%). In H1 2023, 49% of green bonds had tightened compared to vanilla baskets after 7 days, while that figure was 59% in the prior observation period. The percentage of bonds tightening more than their corresponding indices after 7 days was unchanged: 70% in H1 2023, against 70% in H2 2022.

Bonds generally often deliver price tightening in the immediate secondary market since investors may want to increase their position or open a position in a bond they were not allocated. Timing is an important factor because bond indices rebalance at each month end. Therefore, if bonds are issued early in the month, there could be an opportunity for managers to add some off-benchmark performance before bonds are added to benchmark indices. Once bonds enter indices, liquidity can quickly evaporate (independent of credit events), and accurate spreads are quoted on a bilateral basis. As a result, our consideration of the secondary market only extends to one month after the pricing date of each bond.

To contextualise spread movements, we compare each green bond to two alternatives.

31% of EUR green bonds had tightened against both their vanilla basket and corresponding index after a week. These included seven SSA deals among which were **KfW 2033** (165%), **EIB 2028** (83%), and **SNCF 2033** (23%). As already stated, risk aversion and a preference for perceived safer names would have contributed to this performance.

DZ HYP 2026 (CO) was one of the bonds obtaining a greenium and tightened even further (97%) 7 days after pricing, beating both vanilla

Firstly, we match each green bond to a vanilla bond or if possible, a basket of vanilla bonds sharing similar characteristics, issued in the same quarter as the green bond. This comparison is a proxy for the opportunity cost to the investor. Secondly, we compare each green bond to a corresponding index to monitor their performance against the market.

Since it is unlikely that the vanilla bonds are priced on the same day as the green bond, this could be expected to impact performance in the secondary market particularly when markets are volatile. This exercise is designed to illustrate what an investor could otherwise have done with their money in the vanilla bond market during the same period. Volatility sometimes benefits green bonds, other times, not.

baskets and corresponding indices. Over the past year, DZ Hyp has ramped up its commitment to financing Low-Carbon Buildings.

National Broadband Network (NBN) is an Australian government owned broadband infrastructure provider. It has a clear decarbonisation strategy in place with a plan to reach net zero by 2050 (or sooner). Its first EUR green bonds, **NBN Co. 2029** and **NBN Co. 2033** received strong support from the green investor

community when they priced in early March. The shorter deal had tightened by 44% seven days after pricing, and the 2033 tranche managed 14%.

Danish multinational energy company and sustainability leader Orsted priced a three-tranche deal in late May. **Orsted 2026**, **Orsted 2030**, and **Orsted 2035** had all tightened more than their vanilla baskets and indices after seven days, achieving spread tightening of 42bps, 14bps, and 13bps respectively. Orsted is on track to reach its SBTi approved net-zero target for scope 1 and 2 emissions by 2025 and intends to decarbonise its scope 3 emissions by 2040.

In USD, 35% of green bonds had tightened against both their vanilla basket and corresponding index after a week. The spread of the **SMTB 2028** (addressed above) had snapped in by 21% seven days after pricing; the largest change among the USD bonds, and beating both its vanilla basket and corresponding index. **EIB Korea 2033**, in the SSA space, also exhibited strong performance and tightened by 18% in its first week.

American wireless network provider Verizon has priced a USD1bn green bond every year since 2018, adding its fifth deal in May. The **Verizon 2033** tightened by 6% in its first seven days beating both comparables. Proceeds were earmarked for Low-Carbon Energy, Energy Efficiency, Low-Carbon Buildings, Water, and Land Use.

After 28 days

- 49% of green bonds had tightened by more than their vanilla baskets: 51% of EUR and 43% of USD green bonds.
- 67% of green bonds had tightened by more than corresponding indices: 71% of EUR and 57% of USD green bonds

After 28 days, a higher percentage of green bonds had tightened against their corresponding indices in H1 2023 (67%) compared to H2 2022 (64%). However, a lower percentage had tightened against corresponding baskets: 49% in H1 against 55% in H2 2022. 45% of green bonds had tightened more than both corresponding bonds and indices after 28 days.

In EUR, some of the bonds already highlighted in this report continued to demonstrate strong tightening after 28-days: KfW 2033 (133%), EIB 2028 (39%), SNCF 2033 (26%), DZ HYP 2026 (CO) (130%), NBN 2029 (15%), NBN Co. 2033 (12%), Orsted 2030 (18%), and Orsted 2035 (17%).

In February, UniCredit Bank Austria priced its second covered green bond. The EUR750m (USD800m) **BACA 2029 (CO)** deal did not beat its vanilla basket in book building metrics, but priced inside its yield curve obtaining a greenium, and had tightened by more than its comparables after both seven and 28 days. Proceeds from the deal were earmarked for Low-Carbon Buildings supported by Unicredit Bank Austria's loan portfolio.

A second covered bond from the UniCredit stable, **UniCredit CZ 2028 (CO)**, beat its vanilla basket in book building metrics, and then after seven days had tightened by 22% which it maintained after 28 days.

In USD, nine green bonds achieved greater spread tightening compared to both equivalents at the end of the first month. **EIB 2033** exhibited the most aggressive tightening, reaching 48% after 28 days. The USD5bn deal priced in February had tightened by 19% after seven days but was marginally beaten by its vanilla basket which managed 20%.

Hungarian power company MVM Energetika has a monopoly on the production, distribution, and sale of electricity in the country. Its May 2023 Green Financing Framework references the EU taxonomy and lists eligible project categories as renewable energy and electricity networks, both Low-Carbon Energy. Its debut **MVM Energetika 2028 USD750m** deal was priced in early June. The deal did not beat its vanilla basket on book building metrics, but after 28 days had tightened by 11bps, more than both of its comparables.

Methodology notes: 1. Vanilla baskets comprise the closest possible matches based on the considerations highlighted on page 21. We have created this proxy to illustrate what else an investor could have done with their money during the same quarter. 2. Indices. We compare each bond to a standard iBoxx index. The indices are granulated by currency, asset class, tenor, and credit rating: all of which can influence the behaviour of a bond. Each bond is therefore compared to an index sharing similar characteristics; for example, RWE 2029 was matched with the iBoxx EUR Corporates BBB 5-7 index.

Seven calendar days include five data observations. 28 calendar days include 20 data observations.

6. Green bond ETFs

At the end of H1 2023, Climate Bonds was aware of 17 EUR or USD green bond ETFs with combined fund assets of almost USD3bn, an increase of 20% on the prior period. Dedicated ETFs are an important source of secondary market demand for green bonds.

Three ETFs have been added to the list. The **Amundi EUR Government Tilted Green Bond Index ETF** is a seasoned ETF launched in 2018. **X Eurozone Gov Green Bond 1D** and **UBS ETF Green Bond USD** were recently launched in 2022 and 2023 respectively. During the same period, the **L&G Green Bond UCITS ETF** was liquidated.

The EU Sustainable Finance Disclosure Regulation (SFDR) is intended to make it easier for investors to compare sustainable investment options within the European Union. The regulation specifies expectations for disclosure and describing sustainability considerations in investments. There are three categories of fund type:

Article 6 - No sustainability focus or consideration of ESG factors in the investment process.

Article 8 - Promotes environmental and social characteristics. Also known as light green.

Article 9 - Has sustainable investment as its objective and is also known as dark green.

Funds classified as Article 6 are outside the scope of this research. Among the tracked ETFs, five are classified as Article 8, and eight are classified as Article 9. Funds in both categories have continued to attract new assets in 2023. Two ETFs in our sample each increased their assets by 70% during the first six months of 2023: the **Amundi EUR Government Tilted Green Bond Index ETF** (Article 8) and the **iShares EUR Green Bond UCITS ETF** (Article 9).

The **Lyxor Green Bond DR UCITS ETF** remains the largest ETF in our sample with assets of EUR628.9m (USD655.8m). The assets have grown 126 times since the fund was launched in 2017.

ETF name	Currency	SFDR Classification	Index	Launch date	Size at launch	Local 30 Dec 2022	USD 30 Dec 2022	Local 29 June 2023	USD 29 June 2023	Change on period
Lyxor Green Bond DR UCITS ETF	EUR	8	Solactive Green Bond Index	01/02/2017	EUR5m	587.2	628.9	603.3	655.8	4.3%
Van Eck Vectors Green Bond ETF	USD	N/A	S&P Green Bond Select Index	01/03/2017	USD5m	73.5	73.5	75.4	75.4	2.7%
Amundi EUR Government Tilted Green Bond	EUR	8	Bloomberg Euro Treasury Green Bond Tilted Unh EUR index	05/04/2018	EUR296.1m	342.9	367.3	574.7	624.7	70.1%
iShares Global Green Bond ETF	USD	N/A	Bloomberg Barclays MSCI Global Green Bond Select Index	01/11/2018	USD25m	291.1	291.1	314.1	314.1	7.9%
UC MSCI European Green Bond ETF	EUR	9	Bloomberg Barclays MSCI European GB Issuer Capped EUR Index	01/11/2018	EUR20m	17.3	18.1	Unavailable	Unavailable	N/A
Franklin Liberty Euro Green Bond ETF	EUR	9	Bloomberg Barclays MSCI Euro Green Bond Index	01/04/2019	EUR10m	184.9	198.1	257.5	280.0	41.4%
Lyxor Green Bond ESG Screened	EUR	8	Solactive Green ESG Bond EUR USD IG TR Index	01/10/2019	EUR4m	154.8	165.8	168.4	183.0	10.4%
L&G ESG Green Bond UCITS ETF	EUR	9	JP Morgan ESG Green Bond Focus Index	01/02/2021	EUR22.9	6.2	6.7	Liquidated	Liquidated	N/A
iShares EUR Green Bond UCITS ETF	EUR	9	Bloomberg MSCI Euro Green Bond SRI including Nuclear Power Index	25/03/2021	EUR30m	48.4	50.7	79.5	86.4	70.3%
Horizons S&P Green Bond Index ETF	CAD	N/A	S&P Green Bond U.S. Dollar Select Index	01/06/2021	CAD6.2m	5.4	4.3	5.3	4.0	-6.5%
Xtrackers EUR Corporate Green Bond UCITS ETF	EUR	9	Bloomberg MSCI EUR Corporate and Agency Green Bond Index	24/06/2021	EUR20m	148.1	155.3	176.6	192.0	23.7%
Xtrackers USD Corporate Green Bond UCITS ETF	USD	9	Bloomberg MSCI USD Corporate and Agency Green Bond Index	24/06/2021	USD16.872	233.4	233.4	178.0	178.0	-23.8%
Lyxor EuroGov Green Bond DR	EUR	9	Solactive Euro Government Green Bond Index	01/07/2021	EUR48m	124.2	133.0	177.0	192.4	44.7%
Lyxor Corporate Green Bond DR UCITS ETF	EUR	8	Solactive EUR USD IG Corporate Green Bond TR Index	24/08/2021	EUR50m	24.2	25.9	25.3	27.5	6.4%
Franklin Municipal Green Bond ETF	USD	N/A	Bloomberg Municipal Bond Index	02/05/2022	USD101.2	107.9	107.9	110.5	110.5	2.4%
X Eurozone Gov Green Bond 1D	EUR	9	iBoxx EUR Eurozone Sovereigns Green Bonds Capped Index	15/11/2022	EUR3m	4.3	4.6	5.7	6.2	32.9%
UBS ETF Green Bond USD	USD	8	MSCI Global Green Bond 1-10 Year Sustainability Select Index (TR)	08/06/2023	USD20.5m	N/A	N/A	20.6	20.6	N/A
Total Green bond ETF							2464.6		2950.7	19.7%

7. Spotlight: Sovereign Green Bond Club






By the end of H1 2023, Climate Bonds had recorded aligned sovereign green bonds with a cumulative volume of USD314.9bn. EUR is the dominant currency with 75% of the total (USD235.4bn) from 16 countries, and USD takes 5% (USD16.5bn) from six countries.

EUR and USD sovereign green bonds, H1 2023 highlights

- USD40.3bn of aligned sovereign green bonds were priced in either EUR or USD.

- Austria, Germany, Israel, and Italy together priced eight new deals amounting to USD29.7bn.⁴
- Austria, Belgium, France, Germany, and Italy all reopened existing bonds adding EUR9.8bn (USD10.6bn) to the market.
- Israel was the only debut aligned sovereign green bond issuer with its USD2bn deal priced in January. This was also the only USD denominated sovereign green deal.
- Germany priced the largest volume, with EUR13.8bn (USD15bn) split between two new deals and three taps.
- Italy priced a EUR10bn (USD10.1bn) 8-year BTP which was the largest single deal.
- France reopened two deals and remains the largest single issuer of sovereign green bonds with cumulative volume of EUR54.6bn (USD61.7bn).





Reopenings Five issuers reopened existing green bonds in H1 2023

Issuer	Maturity	Date of tap	Size of tap (local)	Size of tap (USD)	Size as of 30/06/2023 (EUR)	Size as of 30/06/2023 (USD)
Austria 	25-05-2023	27-02-2023	EUR100m	USD107m	Matured	Matured
		01-03-2023	EUR160m	USD171m		
		30-03-2023	EUR45m	USD50m		
Belgium 	22-04-2039	02-03-2023	EUR863m	USD930m	EUR5.4bn	USD5.4bn
France 	25-07-2038	24-04-2023	EUR702m	USD769m	EUR5.3bn	USD5.6bn
	25-06-2039	08-05-2023	EUR1.9bn	USD2.1bn	EUR32.9bn	USD37bn
Germany 	10-10-2025	24-01-2023	EUR1.5bn	USD1.6bn	EUR7.5bn	USD8.6bn
		09-06-2023	EUR1bn	USD1.1bn		
	15-10-2027	21-03-2023	EUR1.5bn	USD1.6bn	EUR6.5bn	USD6.6bn
Italy 	30-04-2035	16-03-2023	EUR2bn	USD2.1bn	EUR10bn	USD10.3bn
Total			EUR9.8bn	USD10.6bn		

New bonds

Four sovereign issuers priced new green bonds in H1 2023. Israel was the only aligned debut issuer and the only one to price a sovereign green bond in USD.

Sovereign Scorecard H1 2023

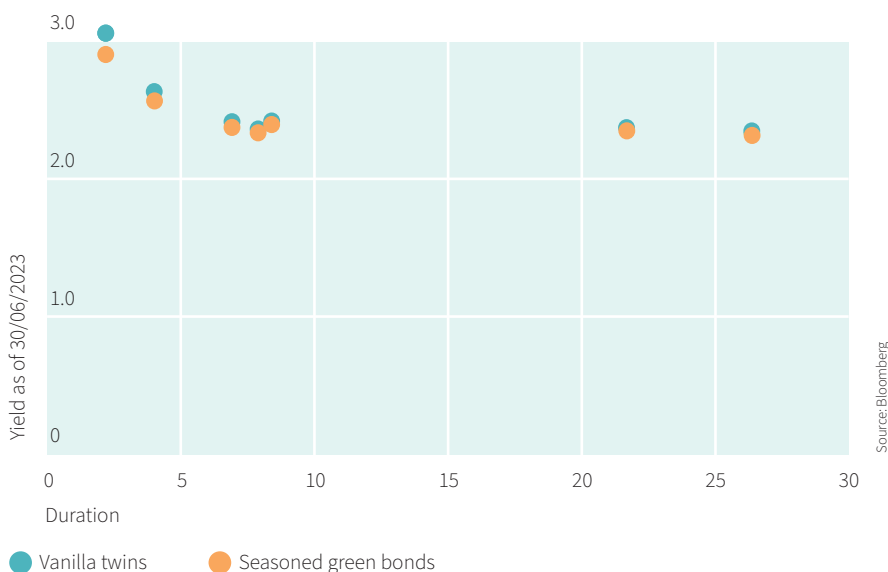
H2 2022	Israel 	Germany 	Italy 	Austria 
Coupon & Maturity	4.5% 17-01-2033	2.3% 15-02-2033	1.8% 15-08-2053	4% 30-10-2031
Pricing Date	17-01-2023	03-05-2023	20-06-2023	13-04-2023
Tenor	10 years	10 years	30 years	8 years
Amount issued	USD2bn	EUR5.25bn/ USD5.8bn	EUR4.5bn/ USD4.9bn	EUR10bn/ USD10.9bn
Total green bonds at 30/06/2023				
Cumulative number of green bonds	1	7	3	6
Cumulative green bond volume	USD2bn	EUR51.3bn/ USD57.8bn	EUR33.5bn/ USD37.1bn	EUR10.9bn/ USD11.7bn
% of outstanding sovereign debt (market data from Bloomberg as of 30-6-2023)	1%	3%	1.4%	2.5%

Israel

In January 2023, Israel joined the Sovereign GSS+ Bond Club with its debut green deal worth US\$2bn. The 10-year bond attracted US\$12bn in bids, covering the book six times, and was eventually allocated to 200 investors in 35 countries. The green financing framework highlighted eight eligible green project categories, including Renewable Energy (Wind & Solar), Environmentally Sustainable Management of Living Natural Resources and Land Use (Land Use), and Adaptation. Israel priced its first deal in USD to attract the international investment community but the treasury is exploring its options for a local currency deal to mobilise local capital and encourage green market creation.



At the end of June Germany's green bonds were inside their vanilla twins



Source: Bloomberg

Germany

Germany was responsible for the largest volume of aligned sovereign green bonds in H1 increasing its number of green deals to seven. The first of the new deals was a green Bund (10-year) priced in late April. Orders for the EUR5.25bn (USD5.8bn) syndicated transaction covered the deal size by 2.8 times. The second deal was a EUR4.5bn (USD4.9bn) 30-year priced in mid-June, and attracted an order book that covered the deal size by 6.4 times. Both followed the twin bond structure, whereby a vanilla bond is issued, closely followed by a green bond sharing similar characteristics. Even in a rising interest rate environment, each bond priced 0.5bps inside its vanilla twin demonstrating enduring demand for the green label. Germany's yield curve has inverted since the prior iteration of this report, but at the end of June its green bond yields were inside those of their vanilla twins.



Austria

Austria pioneered short-term sovereign green bonds and remains the only sovereign to have issued in this space. In October 2022 it issued its first green treasury bills, and green commercial paper followed in March 2023.



In H1 2023, Austria priced four new deals, three of which had a maturity of less than one year. This contributed to the Austrian Debt Management Office (DMO) target to split its green liabilities 80/20 between medium- and longer-term paper. The short-term deals are arranged on a bilateral basis, tailored to suit the preferences of individual investors.

In April, Austria priced a EUR3bn (USD3.3bn) six-year green bond together with a EUR2bn 30-year vanilla deal, via syndicate. The new bond offered investors a new point on the green yield curve, to fill the gap between short-term green paper and the existing 2049 green bond. The order book was 2.5 times covered, and two thirds of the total allocation went to investors describing themselves as green. The DMO observed a 3bp greenium.

Italy

Italy brought the largest single aligned sovereign GSS+ deal in Q2, its third bearing the green label. The EUR10bn (USD10.9bn) 8.5-year maturity, priced via syndicate in early April. Interest in the deal reached EUR52.9bn, enabling 2bps of spread compression. The bond was well received by the market, with 290 investors getting involved. Around two thirds of the deal was allocated to investors describing themselves as green or socially responsible. By the end of Q2, Italy had issued cumulative green bonds totalling EUR33.5bn (USD37.5bn) amounting to 1.4% of its outstanding liabilities.



8. Spotlight: Quality discernment in the sustainability-linked bond market

Introduction

Climate Bonds had recorded cumulative volume of USD252bn in sustainability-linked bonds (SLBs) at the end of H1 2023. This underscores the rapid growth in this label since the first deal was priced in 2017.



Historically, Climate Bonds has recorded, but not screened, SLB deals but in June 2023, published its SLB Database Methodology which will enable screening going forwards.⁵

The methodology organises SLBs into four categories:

- 1. Fully aligned:** SLB targets cover all material sources of emissions and are aligned with the relevant pathway.
- 2. Strongly aligned:** SLB targets cover all material sources of emissions and will be aligned with the relevant pathway by 2030.
- 3. Aligning:** SLB targets cover all material sources of emissions, are aligned with the pathway on a % reduction basis, and the issuer has the basic tenets of a transition plan.
- 4. Not aligned:** SLB targets fail to meet any of the above criteria, or do not meet the other requirements detailed in the SLB Database Methodology.

To ascertain whether investors were making any discernments based on the quality of the SLB targets, Climate Bonds gathered primary market pricing data for SLBs priced in H1 2023, which were selected according to the criteria described below.

The sample included 18 bonds with a broad range of economic sectors represented (as shown in the table).

The results demonstrate that investors in EUR bonds are not giving preference to aligned deals in favour of non-aligned deals. Given that there is

Description of sample	Fully aligned	Aligning	Not Aligned	Totals
EUR	6	1	11	18

Average book cover					
Green	Vanilla	All SLB	SLB fully aligned	SLB aligning	SLB not aligned
2.9	2.7	4	3.8	4.5	4.1

Average spread compression (bps)					
Green	Vanilla	All SLB	SLB fully aligned	SLB aligning	SLB not aligned
27	25	33	32	25	33

no consensus on how to evaluate the quality of SLB targets, this indicates that EUR investors are prioritising exposure to a particular sector, issuer, or sustainability label, regardless of structure or decarbonisation plans. For this reason, Climate Bonds SLB Database Methodology is based on the 5 Hallmarks for credible transition, in particular Hallmark 1: Paris-aligned targets. The purpose of this methodology is to support investors in discerning which bonds have credible and material targets.⁶

Results

Description of sample

The sample is grouped into fully aligned, aligning, and not aligned categories. No eligible bonds fell into the strongly aligned category. Eight economic sectors were represented.

Book building

In H1, it appears that primary market pricing could be squeezed more on SLBs in the not aligned category compared to fully aligned because of strong investor interest. Both fully aligned and not aligned SLBs accumulated larger order books and achieved more

Economic sector	Number of bonds
Communications	2
Consumer Discretionary	2
Consumer Staples	1
Energy	2
Industrials	6
Materials	1
Technology	1
Utilities	3
Total	18

aggressive spread compression in primary markets compared to bonds in the green and vanilla samples.

Green and vanilla bond data is based on the averages of the EUR corporate bonds included in the analysis presented in the body of this paper.

Criteria for inclusion in analysis

- Non-financial corporate issuer
- Currency: EUR
- Pricing date between 01 January 2023 and 30 June 2023
- Original issue size of at least USD500m equivalent
- Investment-grade credit rating
- SLB structure

Note: USD deals were originally eligible but discarded due to the paucity of data

Investors blown away by Vestas SLB

Vestas Wind is a Danish manufacturer, seller, installer, and servicer of wind turbines. Vestas has issued two aligned green bonds, and three fully-aligned SLBs, the most recent of which was **Vestas 2026** priced 08 March. The EUR500m (USD535m) deal was linked to targets related to the reduction of scope 1, 2, and 3 emissions and the material efficiency ratio of its own operations. The deal attracted book cover of four times and the spread narrowed by 30bps during book building. Climate Bonds could



not construct a yield curve for this issuer. Seven days later, the SVB drama was in full swing by which time the deal had tightened by 42%, the largest seven day change in our sample. After 28 days that had settled at a more subdued 13%. Investors evidently like the safety of a pureplay name such as Vestas during turbulent markets, and the materiality and ambition of the targets on this deal underpin the green credentials of the company.



The greenium

Climate Bonds built yield curves for nine SLBs. None of them priced inside their secondary market yield curves. This is unsurprising given the current market backdrop. Climate Bonds analysis of the green bond market revealed that for EUR bonds, investors were willing to pay more for green deals when the label was combined with the highest credit quality during H1.

Secondary market

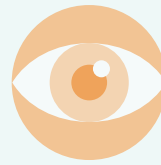
In the secondary market, 83% (15 out of 18) of the SLBs had tightened after both seven and 28 days. Among the three deals that did not tighten, one was classified as aligning, and two as not aligned. However, ten not aligned deals had tightened after both seven and 28 days which again suggests no discernment is being exercised based on the strength of alignment. This emphasises the shortage of supply of benchmark sized EUR SLBs, as observed in the green bond market over the last seven years.

SLB Market Outlook

Climate Bonds found that qualifying SLBs priced in H1 2023 achieved higher book cover, and larger spread compression, on average, when compared with green and vanilla bonds priced in the same period, irrespective of the materiality of the SLB targets. While this did not translate into a greenium in the primary market, most of the SLBs in the sample had tightened seven and 28 days post-issuance. This points to a shortage of supply, not unlike the ongoing dynamic in the green bond market.

However, the SLB sample size is small and fragmented which makes it difficult to draw conclusions. Climate Bonds does not have a clear understanding of the profile of SLB investors and their motivation for buying them. Climate Bonds approached a third of issuers in the sample with questions on the percentage of each SLB allocated to investors describing themselves as green or socially responsible, but received no replies and will explore this further over the coming months.

The reasons for SLB non-alignment with Climate Bonds SLB Database Methodology are evolving and improving. While in the past this was due to a lack of GHG targets (just over half



of all SLBs in 2022), the main reasons in H1 2023 were partial emission coverage in targets (37.8%), lack of GHG targets (35.4%), followed by partial alignment with the pathway (9.8%). The proliferation of Climate Bonds SLB Database Methodology should enable standardised comparisons between SLBs, which could eventually influence their pricing metrics as investors become more comfortable with evaluating their ambition levels.

To contribute to a more credible SLB market, the Climate Bonds SLB Database Methodology clearly defines expectations for SLBs in terms of the materiality of KPIs and alignment with sector-specific pathways. This is intended to contribute to more discipline in the design of such instruments, as well as investor discernment. With the launch of the SLB Database Methodology, Climate Bonds also published a call to action for SLB stakeholders to increase the proportion of SLBs in alignment to 50% by the end of 2023, from 25% in the first half. Climate Bonds will continue to follow developments in this market and through its SLB dataset, supports issuers and investors in building a market that delivers meaningful transition finance.

9. Outlook

During the first six months of 2023, USD278.8bn of aligned green bond volume was added to the Climate Bonds GBDB, denominated in 26 currencies. Just over half of that (51%) was priced in EUR while 20% was priced in USD. The volume and number of deals eligible for inclusion in this report reached its peak with 111 bonds making a combined volume of USD124.6bn. The previous highs of 93 bonds with combined volume of USD93.4bn constituted the H1 2022 sample. The new highs indicate that issuers are coming to the market with more large deals that also have the required rigour and transparency to be in alignment with Climate Bonds GBDB methodology. Included in the sample was USD40.3bn of sovereign green bond volume, the largest in any observation period to date. The momentum behind the sovereign green bond market continues with 30 having issued at least one deal to date, 22 of which have priced at least one deal in either EUR or USD. Governments can use the green label to attract visibility and sometimes pricing benefit for their efforts to decarbonise, and leverage the capital markets to attract crowding in. Japan and the USA are the largest debt issuing developed markets yet to enter the market although Japan has committed to do so.

H1 2023 was characterised by issuer appetite to secure funding before further rate increases, combined with volatility and a flight to quality driven by the collapse of SVB and Credit Suisse. The green label became more important than ever in enabling issuers to get deals done. Investors responded well to large green deals from high quality issuers, with some in the EUR SSA and Covered Bond categories in particular

attracting strong interest during book building, in some cases obtaining a greenium, and tightening further in the secondary market. It is encouraging to see green bonds from utility companies among those with the strongest pricing dynamics in the EUR primary market. Electrification is the most critical process for the decarbonisation of the economy and evidently investors are ready and willing to support this transition. Demand is in place to scale up low-carbon electricity and improvements to the grid, and Climate Bonds hopes that the results of this analysis will motivate more issuers from the utility sector to come to the market to satisfy this.

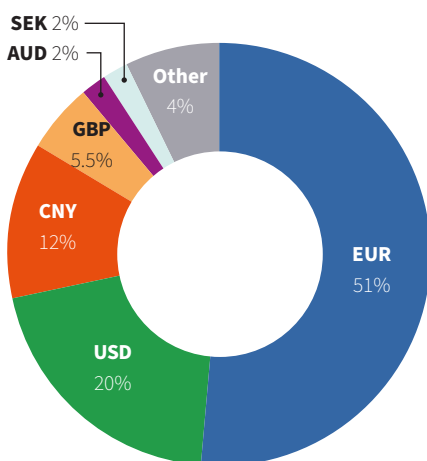
The USD sample remains smaller and more fragmented, making it harder to draw conclusions, but debut issuers continued to join that market, and those that participate report that the green label helps them to attract more interest and diversify their investor base. The results of this analysis clearly point to a market that remains undersupplied with large deals having the required rigour and transparency around the UoP. Climate Bonds encourages all bond issuers to prioritise green investment and leverage investor appetite for green bonds.

Climate Bonds study on the primary market pricing dynamics of a small sample of SLBs suggests that investment decisions are not yet being based on the strength of the issuer's decarbonisation targets. SLBs priced during H1 2023 achieved higher book cover and larger spread compression compared to the green and vanilla bond data sets, and those that were not aligned with Climate Bonds SLB Database

Methodology exhibited the strongest pricing dynamics, on average. However, there was no evidence of greenium indicating that investors are cautious about overpaying for SLBs, which is consistent with the pricing dynamics observed in the corporate green bond market during the same period. Whether in the case of SLBs this reflects a lack of conviction about their quality, or wider concerns about the inflation trajectory and its impact on interest rate expectations remains to be seen. Climate Bonds will monitor and extend its work in this area. The Climate Bonds SLB Database Methodology has been developed to highlight those deals with the highest levels of material ambition and could contribute to the decision-making process of both issuers and investors.

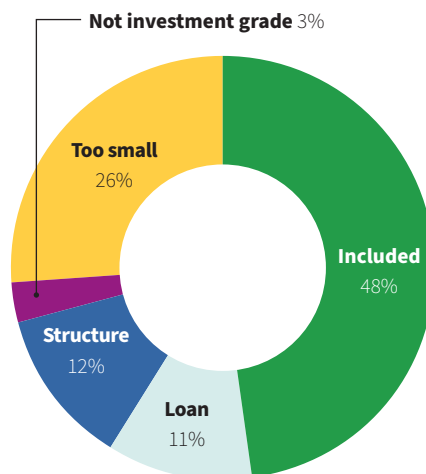
This analysis is based on a limited number of green bonds, chosen according to the parameters outlined on page 21. Green bonds issued in other currencies, structures, formats, and sizes may perform differently from those discussed in this paper. Climate Bonds started monitoring green bond pricing in 2016, and after six-and-a-half years (30 June 2023) 817 securities had been included in the analysis. As the profile of green bonds has evolved in the intervening period, pricing dynamics have also changed. Observations made five years ago will almost certainly not pertain to the current market which is rapidly developing. Climate Bonds will continue to monitor the behaviour of green bonds in the primary and immediate secondary markets.

EUR and USD took almost three quarters of the aligned volume in H1 2023



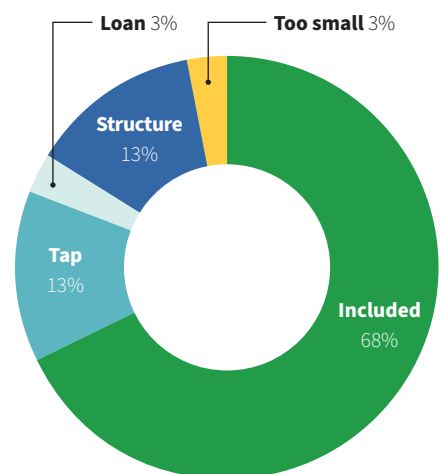
Source: Climate Bonds Initiative

Almost half of the USD volume was included in this analysis



Source: Climate Bonds Initiative

68% of EUR volume was included in this analysis



Source: Climate Bonds Initiative

Methodology

This paper includes labelled green bonds issued during H1 2023. Labelled green bonds meeting the following specifications are included:

- Announcement date between 01 January 2023 and 30 June 2023
- Currency: EUR or USD
- Benchmark size i.e., >= USD500m
- Investment grade rated
- Minimum term to maturity of three years at issue
- In alignment with the Climate Bonds GBDB methodology and included in the Climate Bonds GBDB

Amortising, perpetual, floating rate, and other non-vanilla structures were excluded. These parameters are designed to capture the most liquid portion of the market while not limiting the diversity of data.

All historical data is based on asset swap spreads for EUR denominated bonds. USD bonds are compared to a US treasury curve. All historical data is from Refinitiv EIKON.

Comparable baskets include bonds issued in the same quarter as the subject green bond. Comparable bonds must fit the parameters described above except that they are not labelled and the UoP is not explicitly green, and they must not have been priced prior to 2014. Baskets comprise the closest possible matches based on the following considerations in order of priority: a) currency, b) market type (EM/DM/SNAT/Sukuk), c) no other thematic label, d) seniority, e) maturity, f) credit rating and g) sector. If corresponding bonds cannot be found, best efforts are made to find suitable alternatives from the available sample. The resulting baskets are a proxy for how the money could have been invested in the same quarter in which the green bond was issued. The number of bonds in each basket ranges from one to seven bonds. We acknowledge that bonds behave differently depending on when they are issued and that geopolitical events can affect bond prices from one day to the next. This proxy was designed to circumvent the fact that vanilla bonds and green bonds with similar characteristics are rarely issued on the same day.

Endnotes

1. MSCI <https://www.msci.com/market-classification>
2. Bloomberg, 10/01/2023, EU Credit Close: Second Biggest Day on Record with EUR39b in Sales, Ronan Martin
3. Secondary market asset swap spreads from REFINITIV.
4. Austria's short-term deals are not included in the aggregate statistics for this report but are highlighted to showcase the development of the short term sovereign debt market.
5. Climate Bonds Initiative, [Sustainability-Linked Bond Database Methodology](#), June 2023 [Sustainability-Linked Bonds Database | Climate Bonds Initiative](#)
6. Climate Bonds Initiative, Transition Finance for Transforming Companies, September 2022, [Transition Finance for Transforming Companies | Climate Bonds Initiative](#)



Prepared by Climate Bonds Initiative

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