July 2025

Institute for Energy Economics and Financial Analysis

Sustainability-Linked Bonds: Why Europe Can Reignite the Market

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Key Findings

Sustainability-linked bonds (SLBs) are an innovative tool for issuers to incentivise decarbonisation and for investors to navigate climate-related risks. Europe holds the key to reviving the market.

While the SLB market is at an early stage of development, major European corporates, sovereigns and financial institutions are well equipped to drive its growth and unlock new portfolio opportunities.

As investors assess SLB deals more closely, the market can evolve with more nuanced structures that better reflect issuers' varied transition plans.

Slovenia's watershed SLB issuance may encourage other European countries to explore SLBs as a complementary tool to their green bond programmes.

Executive Summary

The sustainability-linked bond (SLB) market experienced a continued slowdown in the first half of 2025, reflecting growing scrutiny over the credibility of transition finance strategies and market design and pricing. In IEEFA's view, despite the setbacks, SLBs are still a useful tool for issuers to incentivise decarbonisation and for investors to navigate climate-related risks. Europe – the centre of SLB innovation – holds the key to reviving the market.

Unlocking the potential of SLBs will require a broader and more diversified issuer base, more rigorous target setting and the use of more innovative financial structures. Many major European sovereigns, corporates and financial institutions are still absent from the market, but they are well equipped to enter and foster credible market development.

The leading SLB issuer, Enel, remains committed to the structure, despite its 2023 target miss. While the company is firmly back on its decarbonisation pathway, it could potentially use more ambitious SLB structures, which would not only benefit its reputation but could also lead the market's development.

Italy, the largest SLB market by issuance volume, reveals diverging levels of corporate climate ambitions. For example, gas transmission and storage operator Snam does not report emissions from transported gas. As such, SLB targets often differ in terms of coverage, highlighting the importance for investors to scrutinise each structure on a deal-by-deal basis. As investors become more efficient in incorporating these assessments, the market will mature and feature more nuanced structures.

Notably, Slovenia's recent sovereign SLB debut marks a watershed moment for the SLB market. The €1 billion 10-year note achieved a book size of €6.5 billion, setting the foundation for sovereign SLBs as an asset class. Crucially, this issuance embeds national climate targets into sovereign finance. Other European sovereigns should contemplate SLB issuances, which would add credibility to their climate policies, in line with Paris-aligned goals. This would serve as an important catalyst for overall market growth, led by issuers across different issuer types, sectors and stages of their transition plans. Germany, which pioneered a twin green bond programme, could take a similar approach for SLBs.

IEEFA believes the combined sustainability-linked use-of-proceeds structure has the potential to be impactful and help spur an SLB revival. It presents an opportunity for established green bond investors – especially those not yet active in the SLB market – to enhance the accountability of the proceeds' impact and the contribution of those proceeds to the issuer's overall transition plan.

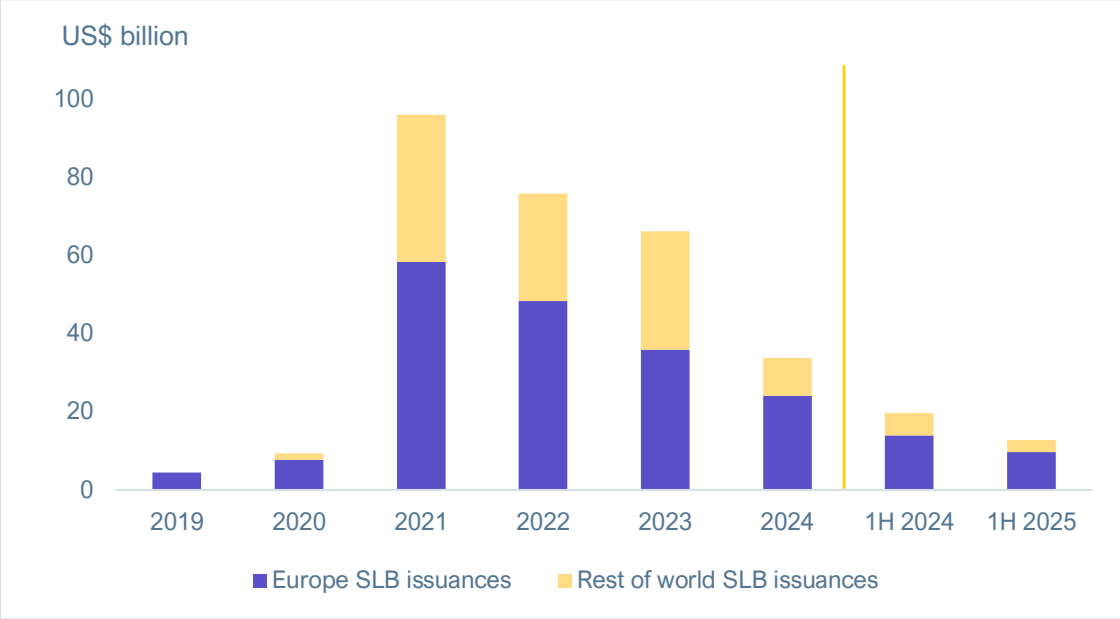
These developments could foster market liquidity and price benchmarking capabilities. Over time, nuanced SLB structures could help investors manage climate-related credit risks while offering issuers a way to signal the credibility of their transition plans and potential pricing benefits.

SLB Potential Remains Despite Falling Issuance

A key moment for the sustainability-linked bond (SLB) market came in April 2024 when Italian power utility Enel, the world's largest SLB issuer, announced it had missed its 2023 sustainability performance target, triggering a coupon step-up on its €10 billion of SLBs.[1,2] Some investors viewed Enel honouring its commitments as a sign of credibility for the market. Since then, the company has remained committed to the SLB market. But broader participation has not followed, as issuance has continued to slow.

Issuers retreating from the market might reflect concerns over the quality of bond structures and costs associated with issuance and compliance. SLB issuances fell by 35% year on year in the first half of 2025 (1H 2025), following a 49% decline in 2024.[3] Europe, the leading region for SLBs, saw issuances drop by 30% year on year in 1H 2025 and by one-third in 2024. Fewer than 10 issuers made their SLB debut globally in 1H 2025, a sharp decline compared to more than 100 new issuers in 2022.

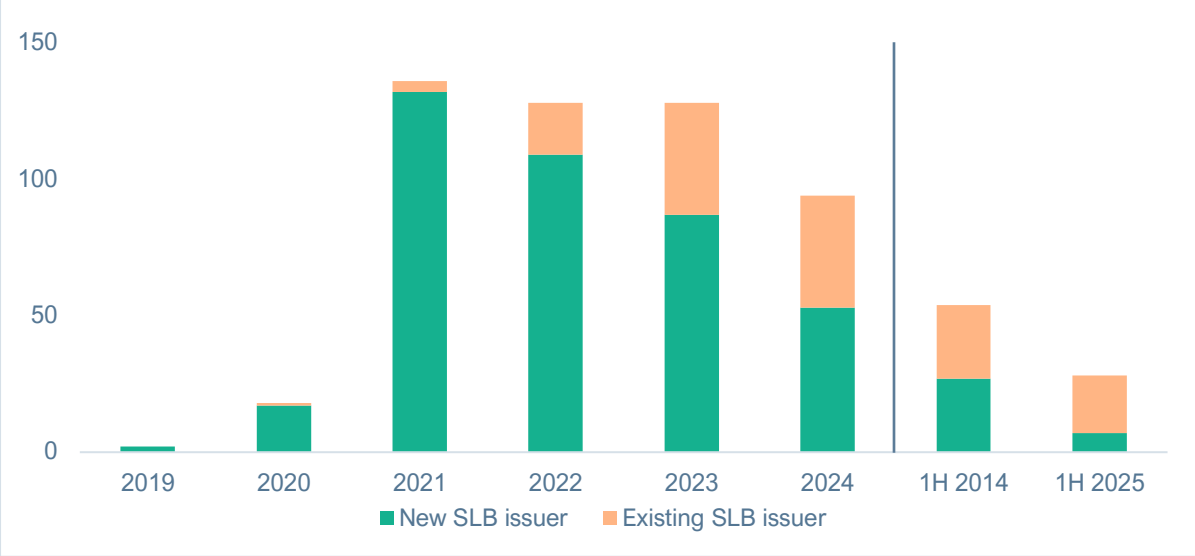
Figure 1: Sustainability-Linked Bond Issuances Continue To Slow



Source: Environmental Finance Data, IEEFA.

[1] Global Capital. SLBs come of age as €10bn of Enel bonds step up. 26 April 2024.
[2] IEEFA. Takeaways from Enel's sustainability-linked bonds performance targets. 25 March 2024.
[3] Market data in this report is taken from Environmental Finance Data, accessed on 6 July 2025. See Environmental Finance Data's methodology.

Figure 2: Number of Issuers Entering the SLB Market Has Also Shrunk



Source: Environmental Finance Data, IEEFA.

Despite the setbacks, IEEFA continues to view SLBs as an innovative tool for advancing sustainable finance and an enabler of real-world decarbonisation.

Issuers from sovereigns, corporates to financial institutions can use SLBs to demonstrate the seriousness of their transition planning. Assessments of credible transition plans have increasingly become central to credit analysis.[4] Therefore, issuers with credible and accountable transition targets, actionable measures, clear investment plans and strong governance – even those in high-emitting sectors – might benefit from improved access to capital and lower financing costs, which can outweigh the extra costs related to the issuance.

For investors, SLBs offer a performance-linked structure that provides compensation when sustainability targets are missed, aligning financial returns with climate performance. As the market matures, investors can better evaluate the credit implications of climate-related risks and opportunities, enabling more informed climate-aligned capital allocation. With bonds' varying financial and structural characteristics, investors can customise and structure risk, return and impact.

An obstacle to scaling up the SLB market is the limited participation of large, high-profile issuers (apart from Enel). Major sovereigns, financial institutions and corporates could bring market volume, liquidity, confidence and benchmark-setting potential, all of which can catalyse continued market growth and investor interest.

IEEFA believes that SLBs still hold significant potential for revival. Unlocking this will require a broader and more diversified base of issuers, more rigorous target setting and the use of more innovative financial structures. A steady flow of first-time issuers is crucial to ensure representation

[4] IEEFA. European oil: Navigating credit risk towards net zero. 13 March 2025.

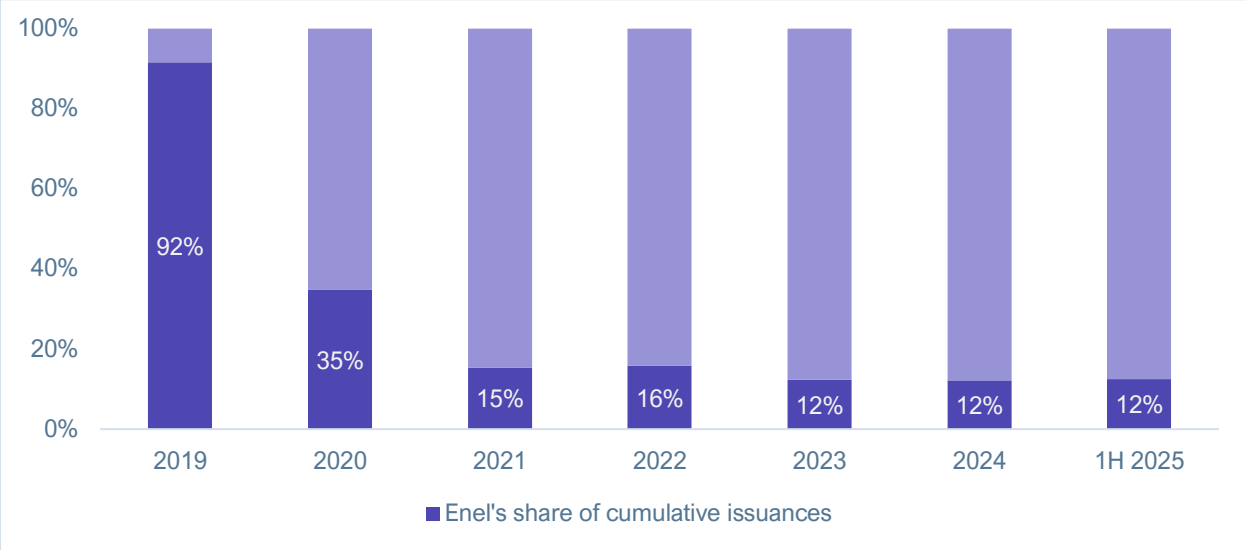
across issuer types, sectors, geographies and the credit rating spectrum. As existing issuers' target test dates approach, further progress will depend on how they revisit their corporate strategies and SLB frameworks while improving transparency and reporting quality to maintain investor confidence and market momentum.

Enel: Continued SLB Champion Following Target Miss

Following its 2023 target miss, Enel continues its commitment to SLBs, raising all senior bonds with the SLB format. The company's outstanding share of cumulative issuances in the global market remains significant at 12% – despite its smaller overall fundraising between 2023 and 2024 compared with 2021 and 2022 – reflecting a still highly concentrated market.

Enel's role in shaping the trajectory of the SLB market remains prominent. In IEEFA's view, it is important that the company continues to renew its transition ambitions and demonstrate leadership. As target dates approach, credible reporting and a showcase of accountability will be critical not just for Enel's reputation but also for reinforcing investor confidence in the broader market.

Figure 3: Enel's Prominence in SLB Market Remains



Source: Environmental Finance Data, IEEFA.

Decarbonisation Advances, but 2030 Will Be a Key Test

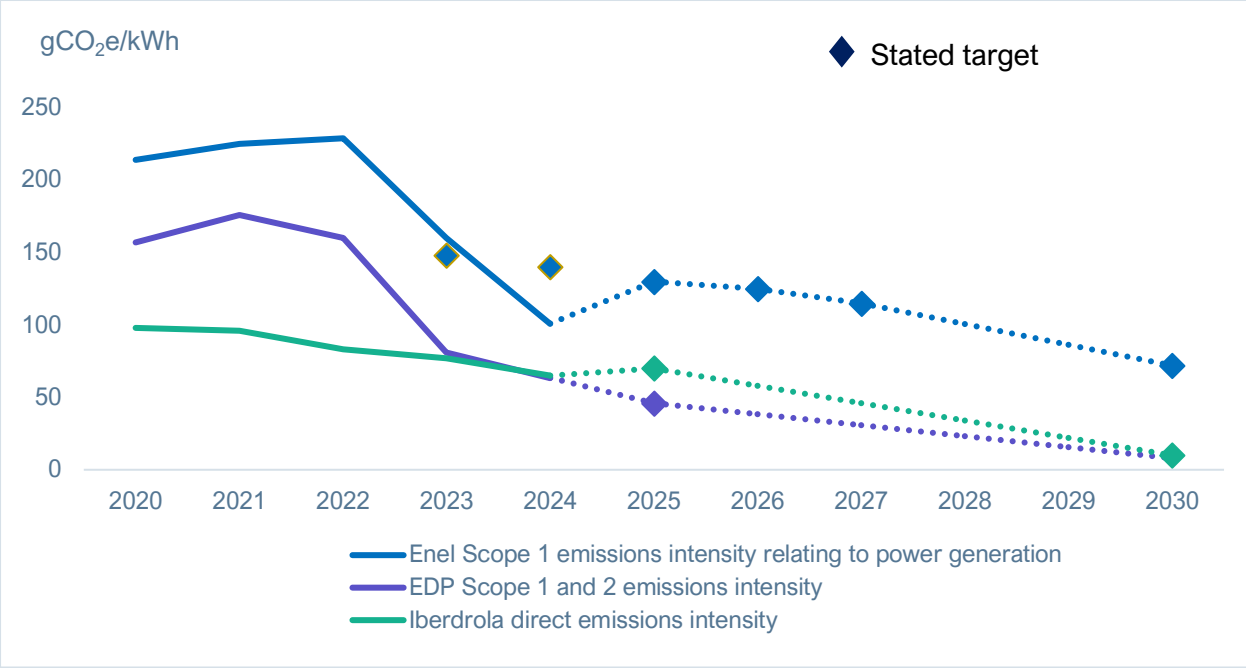
Enel missed its SLB's 2023 carbon intensity target primarily because of higher-than-expected coal-fired generation. However, the company is firmly back on course to decarbonise its power generation. In 2024, its emissions relating to power generation declined significantly to 101 grams of carbon dioxide equivalent per kilowatt-hour (gCO_2e/kWh) – well below its SLB target – from 160 gCO_2e/kWh in 2023. The decrease was primarily driven by lower thermoelectric production, with a 78% decline in coal burned.

Meanwhile, Enel continued its renewable growth. The company invested €3.2 billion in renewables in 2024, adding 3.9 gigawatts (GW) of renewable capacity (including 1.3 GW of battery energy storage systems). Net wind and solar capacity increased by 1.8 GW to 28.0 GW.

While Enel's carbon intensity trajectory remains above that of advanced European utilities such as EDP and Iberdrola, the 2030 target will be a milestone. In Enel's 2025-2027 strategy,[5] the company plans to invest €12 billion in renewables, aiming to add 12 GW (of which about three-quarters will be wind and solar) to reach 76 GW installed by the end of 2027 (including managed capacity and battery storage). The 2025-2027 strategy did not update a previous target of tripling renewable capacity from 2021 levels to 154 GW by 2030.[6] At the current pace, the company appears to be off track to meet this objective.

That said, Enel's 2030 targets tied to its SLBs – 72 gCO_2e/kWh carbon intensity for power generation and 80% net installed renewable capacity – are achievable, but they will rely on continued renewables deployment. IEEFA estimates that the company may need to add up to 25 GW of new renewable capacity (excluding managed capacity and battery storage) between 2025 and 2030 to stay on track with its 2030 SLB targets.[7] For every 1 GW reduction in thermal generation, Enel could reduce its need to build 4 GW of renewables capacity.

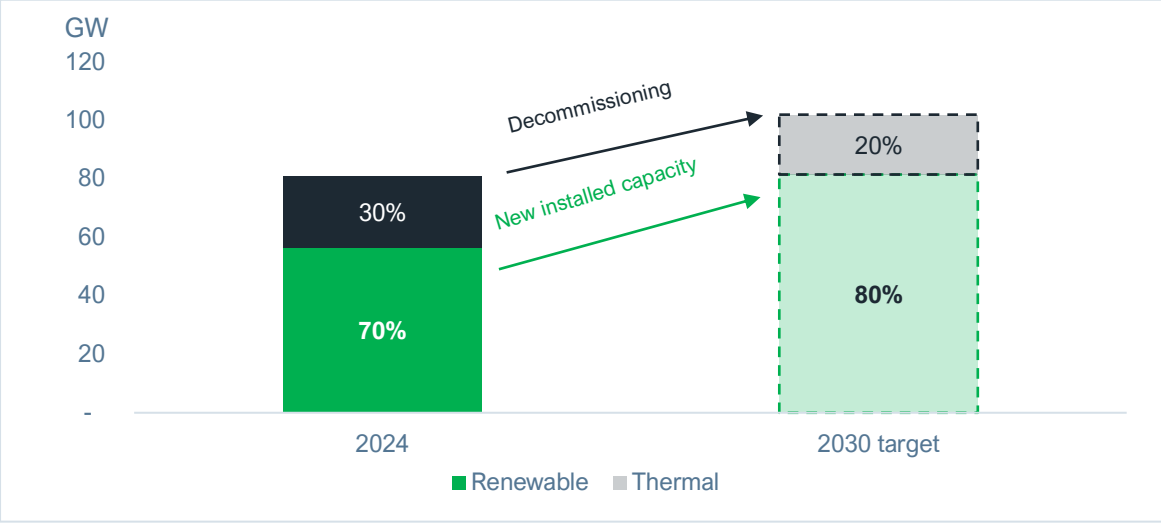
Figure 4: Enel Has Regained its Decarbonisation Momentum



Source: Company reports, IEEFA.

[5] Enel. Strategic Plan 2025-2027. 18 November 2024.
[6] Enel. A Compass to guide us towards enabling progress with sustainable energy. 29 September 2022.
[7] This considers the planned phase out of Enel's coal plants by 2027 and the coal-to-gas conversion of its Fusina power plant, and assumes no further acquisitions, divestments or decommissioning of other thermal capacity.

Figure 5: Enel's 2030 SLB Targets Are Driven by Renewable Buildout and Thermal Power Decommissioning



Source: Company reports, IEEFA.
Note: Thermal capacity includes nuclear plants.

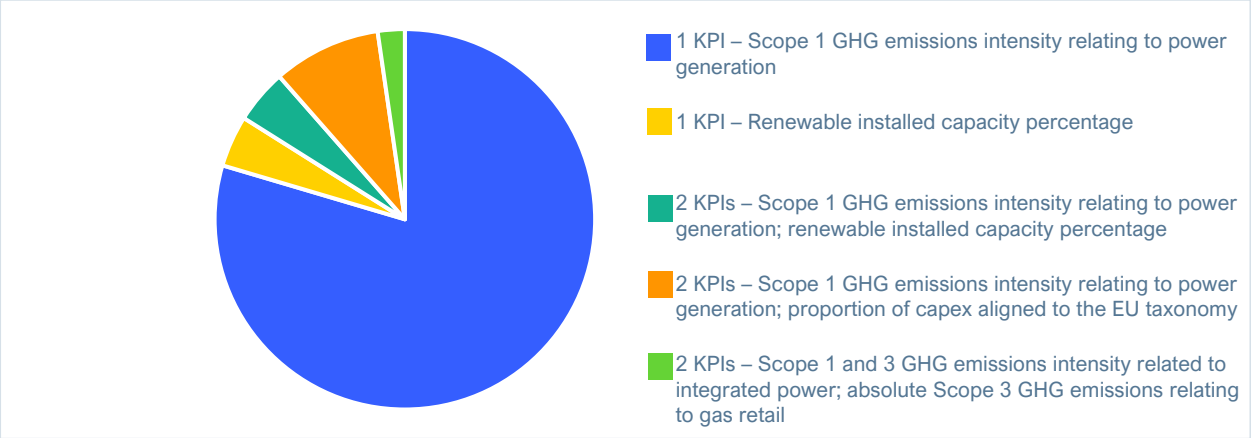
SLB Constructs Show Progress, But Gaps Remain in Capturing Transition Plan

Enel has ambitious and relevant key performance indicators (KPIs) for its SLBs. The emissions targets are well aligned with the 1.5-degree pathway certified by the Science Based Targets initiative (SBTi), with no use of carbon removals and covering a large majority of its Scope 1, 2 and 3 emissions. Commendably, the company incorporates complementary levers – including installed renewable capacity and EU taxonomy-aligned investments – that go beyond emissions alone.

However, it is worth noting that Enel has not issued SLBs that combine its KPIs in a way that would cover most of its total emissions. The majority of its issuances are linked to a single KPI: emissions relating to power generation, which may appear easier for investors to navigate. As highlighted by the 2023 target miss, the metric can be subject to annual fluctuations in the production mix and may not fully capture the company's transition progress. While Enel updates its SLB framework annually, not all near-term targets appear equally ambitious. The 2027 target of 115 gCO_2e/kWh carbon intensity related to power incentivises little progress, as the company already reported a lower intensity in 2024. Although this allows for short-term accountability and progress tracking, the real test remains the tightened 2030 target,[8] which is 37% lower than the 2027 aim.

[8] When Enel first launched SLBs in 2019, it set a 2030 Scope 1 emissions target related to power generation of $125gCO_2e/kWh$. It was tightened to $82gCO_2e/kWh$ in 2022 and further to $72gCO_2e/kWh$ in 2024.

Figure 6: Most of Enel's SLBs Are Linked Only to Emissions Intensity Relating to Power Generation



Source: Company reports, IEEFA.
Note: Outstanding SLBs as of February 2025.

While investors may find simpler structures more digestible, the credibility of Enel's SLBs would improve if they were linked to a set of comprehensive targets covering its total emissions and transition actions, including renewable development and investments. SLBs could also be directly tied to measures that reflect Enel's key decarbonisation milestones, such as the phase out of coal power, the reduction in gas sales and the increase in electricity sales. These could allow the company to provide a more comprehensive picture of its long-term decarbonisation trajectory.

> **The credibility of Enel's SLBs would improve if they were linked to a set of comprehensive targets covering its total emissions and transition actions, including renewable development and investments.**

A key gap in Enel's SLB framework is the lack of new targets related to its strategic shift towards grid development. The company plans to invest €26 billion (around 60% of its total capex plan) in grids for 2025-2027, primarily in Europe, in line with the EU's competitiveness and climate objectives. Grid activities accounted for about one-third of operating profits in 2024, and profit contributions from grids are likely to increase. Although the company has outlined some measures to track grid development, these have not been incorporated into the SLB framework.

While Enel's EU taxonomy-aligned capex target is well designed to reflect the full scope of the company's business activities, its effectiveness is limited by the unchanged target, remaining at 80% from 2023-2025 to 2025-2027. In 2024, the company reported that 83.8% of its capex was taxonomy-aligned, primarily driven by €6.1 billion invested in grids and €3.2 billion in renewables. Non-aligned capex reached €1.8 billion, including spending on the Fusina coal-to-gas project, thermal power maintenance and process enhancements in the retail segment. Renewable and grid investments account for 90% of capex in the 2025–2027 plan. This underscores the room for a more progressive target linked to SLBs for better coherence with the business strategy.

Table 1: Mapping Enel's Transition Plan With SLBs

Transition plan	Related business activity	Targets and levers by 2030	Covered by SLB KPIs	Targets and levers by 2040	Covered by SLB KPIs
Decarbonisation of power generation	Thermal generation and trading (14% of 2024 operating profit); Enel Green Power (32%)	Scope 1 greenhouse gas (GHG) emissions intensity relating to power generation (gCO_2e/kWh)			
		72	Yes	0	Yes
		Scope 1 and 3 GHG emissions intensity related to integrated power (gCO_2e/kWh)			
		73	Only in framework, not issue	0	Yes
		Invest in and increase renewable capacity	Yes	100% installed renewable capacity	Only in framework, not issue
		Coal phaseout by 2027	Partially through emissions reduction target	-	-
Promote electrification	End-user markets (20%)	Absolute Scope 3 GHG emissions relating to gas retail ($MtCO_2e$)			
		10.3	Only in framework, not issue	0	Yes
		Reduce the volume of gas sold to 5.3 billion cubic meters	No	Complete phase-out of retail gas	No
		Increase annual electricity unit consumption of business to consumer customers on the free market (Italy and Iberia) to 3.5 megawatt-hours	No	-	-
Grid development	Enel Grids (35%)	6 million distributed generation connections; 70% of grid customers digitalised	No	-	-
Fleet, building, distribution and supply chain management	-	Additional Scope 1, 2 and 3 emissions ($MtCO_2e$)			
		10.4	No	<2.5	No

Source: Company reports, IEEFA.

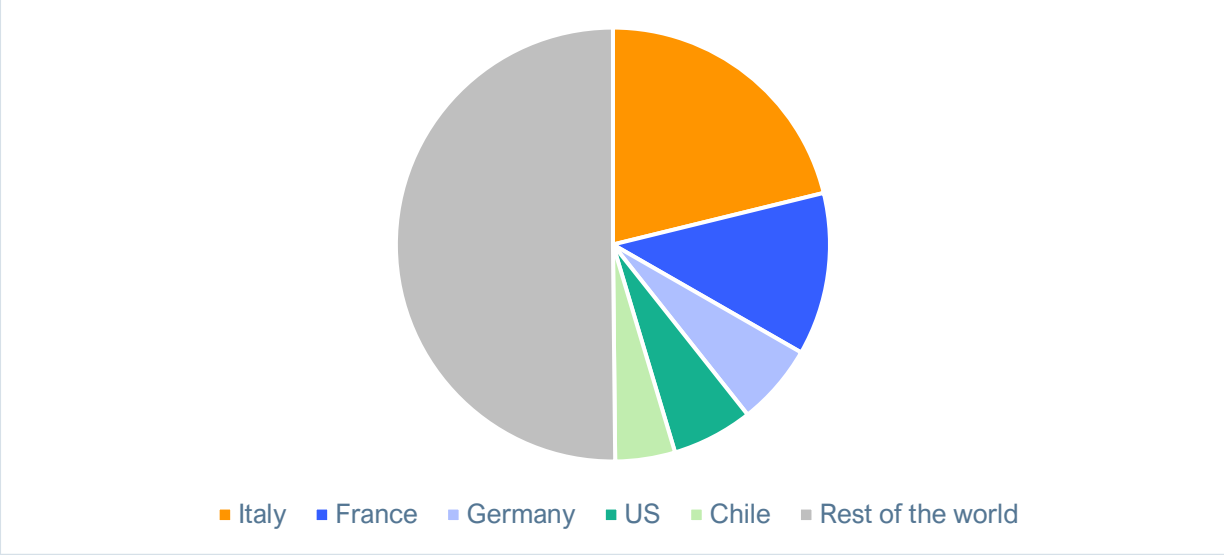
Italian Corporates: Diverging Ambitions Highlight Need for Deal-by-Deal Scrutiny

While Europe continues to dominate the global SLB market, issuances remain highly concentrated by country. Italy alone accounts for one-fifth of global all-time issuances. This concentration is partly driven by Enel, but other major Italian corporates – such as Eni and Snam – also rank among the top SLB issuers in the region.

Major Italian energy and utility companies share similar credit ratings and partial ownership by Italian public entities, yet they differ significantly in their progress towards climate transition and their emission profiles. This highlights the complexity investors face when managing climate transition risk exposure within portfolios. Investors could better assess credit implications of the companies' differing climate exposures by promoting the use of SLBs with nuanced structures that enhance deal comparability, issuer transparency and accountability.

Meanwhile, the SLBs issued by these corporates have diverging levels of ambition and financial materiality, reflecting room for development in a still-nascent market. This underscores the need for investors to scrutinise each deal individually, allowing for more efficient pricing – essential for continued market development.

Figure 7: Global Cumulative SLB Issuances by Country



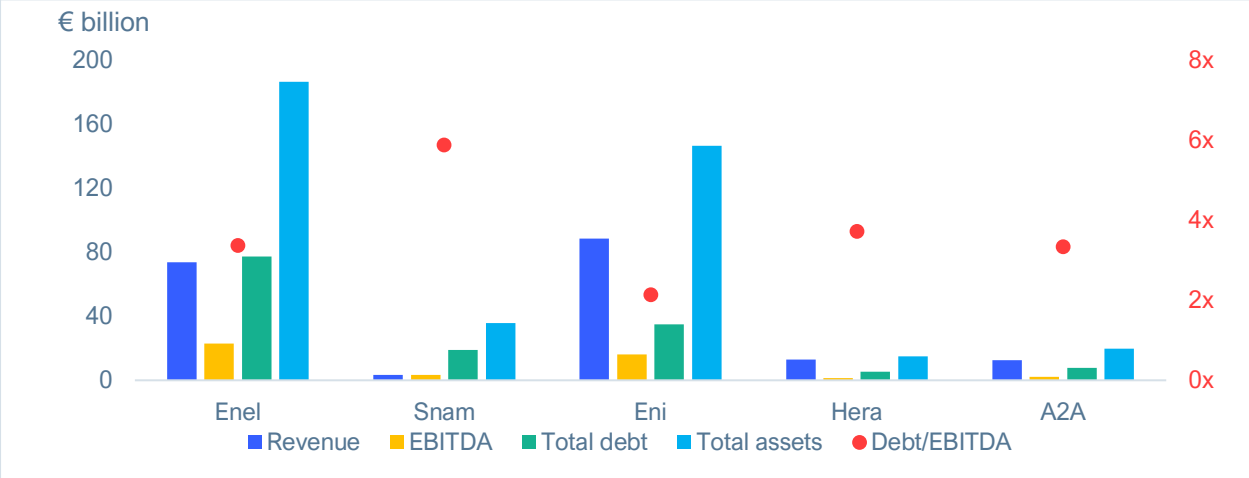
Source: Environmental Finance Data.

Table 2: Italian Energy and Utility Companies With Similar Credit Ratings but Varying Business Segments

	Enel	Snam	Eni	Hera	A2A
Credit ratings (S&P/Moody's/Fitch)	BBB/Baa1/BBB+	A-/Baa2/BBB+	A-/Baa1/A-	BBB+/Baa2/-	BBB/Baa2/-
Italian state ownership	23.6% by Ministry of Economy and Finance	18.5% indirectly by Cassa Depositi e Prestiti (CDP)[9]	31.835% by CDP and Ministry of Economy and Finance	46% by over 100 municipalities	50% by City of Milan and City of Brescia
Business activities	Power generation; energy distribution and retail	Regulated gas transportation and storage	Oil and gas exploration and production; gas and LNG portfolio; refining and retail marketing	Gas and electricity distribution and sales; district heating; integrated water cycle, waste management	Power generation; gas and electricity distribution and sales; water; waste treatment and collection; district heating and cogeneration
Business plan	2025-27 €43 billion investment in grids and renewables	2025-29 €12.4 billion investment primarily in gas pipeline replacements, green molecules and maintenance	2025-28 €27 billion net capex, of which 30% is low and zero carbon	2024-2028 €4.6 billion investment in networks, waste and renewable energy	2024-35 €22 billion investment in distribution networks, renewable capacity and waste

Source: Companies' websites (accessed on 21 July 2025), company reports, IEEFA.

Figure 8: Italian SLB Issuers' Key Financials



Source: Company reports, LSEG Workspace, IEEFA calculations.
Note: As of 2024.

[9] Cassa Depositi e Prestiti is a public development institution 82.77% owned by the Italian Ministry of Economy and Finance.

Which Scope of Emissions?

GHG emissions are the most used metric in SLBs, with two-thirds of issuers adopting some form of emissions-related targets.[10] These targets are not necessarily equally ambitious and material for companies.

The concept of SLBs is intended to drive corporate decarbonisation, particularly in the high-emitting sectors where high baseline emissions allow for more material reduction impacts. The EU's Fit for 55 and REPowerEU plans and Italy's National Energy and Climate Plans have prompted companies to conduct transition planning. This has two distinct implications within the energy sector: For power generation companies, the focus is on lowering carbon intensity by phasing out fossil fuels and expanding renewable energy in line with national clean power targets; for oil and gas players, managing Scope 3 emissions and demand-side dynamics presents business challenges.

Italian energy and utility corporates have varying emissions profiles, reflecting the differences of their business models. For multi-utilities like Enel and A2A, emissions are distributed across direct power generation, generation of purchased electricity sold to end users and the end use of gas. Hera, with little power generation capacity, has emissions mainly from Scope 3. Oil company Eni's emissions stem largely from the use of products sold. Among the Italian companies covered in this research, Snam has the lowest reported Scope 1, 2 and 3 emissions – as it is focused on gas distribution and storage – but these exclude its transported emissions, which are 100 times larger than its reported Scope 1 and 2 emissions.[11]

[10] According to Environmental Finance Data.
[11] IEEFA. Collector of labelled debt: Snam's net-zero transition plan has much to prove. 27 January 2025.

Understanding GHG emissions scopes

Under European Sustainability Reporting Standards,[12] companies are required to disclose gross Scope 1, 2 and 3 emissions, as well as their total GHG emissions.

- **Scope 1:** Direct GHG emissions from sources that are owned or controlled by the undertaking (such as company-owned facilities).
- **Scope 2:** Indirect emissions from the generation of purchased or acquired electricity, steam, heat or cooling consumed by the undertaking.
- **Scope 3:** All other indirect GHG emissions that occur in the value chain of the reporting undertaking, including both upstream and downstream emissions. These are divided into 15 categories defined by the GHG Protocol, such as purchased goods and services, fuel- and energy-related activities and the use of sold products.

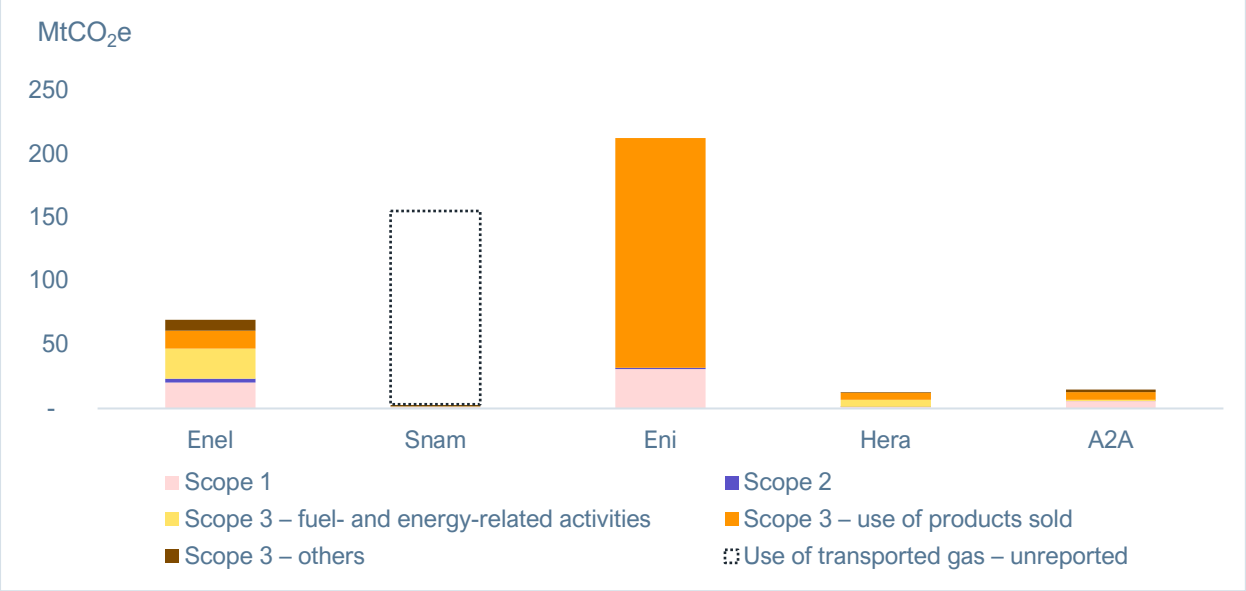
An undertaking's emissions profile will vary depending on its business model. Scope 1 emissions provide insight into the undertaking's direct climate impact. Scope 3 emissions, for many undertakings, may make up the largest share of total GHG emissions and are a key driver of the undertaking's transition risk.

Enel and A2A have SLB targets based on Scope 1 emissions intensity, reflecting the materiality of the power generation activity. But this addresses only about a third of their emissions. A2A has not set targets for other scopes of emissions. Enel rarely incorporates its Scope 3 targets into SLB structures – either separately or in combination with other scopes – despite them being defined in its SLB framework.

Eni and Hera have emissions profiles dominated by Scope 3, but they differ in the extent to which their SLBs' KPIs cover these emissions. Eni has an SLB target based on its net carbon footprint – a company-adjusted measure of Scope 1 and 2 emissions that includes activities on an equity basis and the use of carbon credits[13] – which was 6.8 million tonnes (Mt) of CO_2e in 2024. The amount is significantly lower than its combined Scope 1 and 2 emissions of 32 $MtCO_2e$, based on the European Sustainability Reporting Standard, and even lower than total emissions including Scope 3. Although Eni's SLB framework includes Scope 3 emissions, they have not been used in its SLB issuances. By contrast, Hera has Scope 1, 2 and 3 absolute emissions targets that cover 80% of its emissions, with its reduction pathway certified by SBTi as being well below two degrees.

[12] European Commission. Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 supplementing Directive 2013/34/EU as regards sustainability reporting standards.
[13] Eni. Our actions to monitor GHG emissions. Accessed 6 July 2025.

Figure 9: Italian Corporates Have Wide-Ranging Emissions Profiles



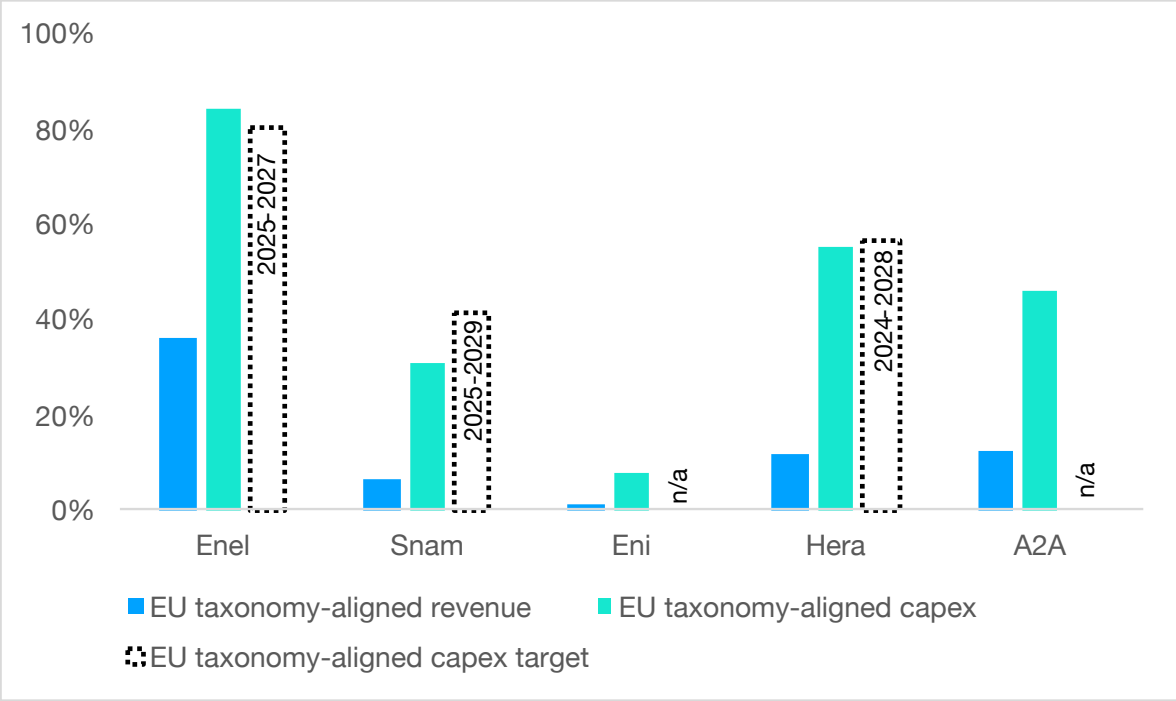
Source: Company reports, IEEFA.
Note: Eni disclosed Scope 3 emissions only for use of products sold. Data as of 2024 for Enel, Snam, Eni and Hera, and 2023 for A2A.

SLB Design Is Not One Size Fits All

Differences in transition risk exposure among corporates suggest a need for more comprehensive and targeted SLB goals beyond emission targets. First, setting EU taxonomy-related SLB targets helps contextualise a company's transition planning – such alignment could reveal a company's transition progress and may influence its cost of capital over time. Enel has made relatively advanced energy transition progress, reflecting higher taxonomy alignments to date. It also stands out as one of the very few companies to include taxonomy alignment in SLBs, which shows accountability. By contrast, Eni has a far lower alignment with the taxonomy. The company aims to invest 30% of its capex in low-carbon activities between 2025 and 2028.[14] But this target lacks clarity in how it maps to taxonomy definitions, limiting its effectiveness in mitigating exposure to transition risk.

[14] Eni. Capital Markets Update 2025-2028. 27 February 2025.

Figure 10: Italian Corporates' Differing EU Taxonomy Alignment



Source: Company reports, IEEFA.
Note: Historic alignment percentage as of 2024. A2A expects 78% of its capex to be taxonomy eligible over 2024-2035.

What's more, linking to concrete decarbonisation actions is central to a coherent, credible transition. Enel, Eni and A2A have included renewable capacity in their SLB frameworks. Eni plans to increase its installed renewable capacity to 15 GW by 2030, contributing €2.5 billion of pro-forma earnings before interest, taxes, depreciation and amortisation (EBITDA).[15] The company did have this target in its 2023 SLB framework, but it has not been used in issuance. Credibility for SLBs would improve if the company incorporates the target in future issuances, combining with other actions such as electric vehicle charging point development, for example. This would address the company's core transition planning efforts. Meanwhile, Snam has not yet set targets to sufficiently address the significant transition risks associated with its core gas transmission operations.[16]

[15] Ibid.
[16] IEEFA. Collector of labelled debt: Snam's net-zero transition plan has much to prove. 27 January 2025.

Table 3: Comparison of SLB Targets by Italian Corporates

	Enel	Snam	Eni	Hera	A2A
SLB issuances	**US$37.1 billion**	**US$6.3 billion**	**US$5.3 billion**	**US$1.2 billion**	**US$1.1 billion**
Number of targets	Five	Three	Four	Two	Three
Target 1	Scope 1 GHG emissions intensity relating to power generation	Scope 1 and 2 emissions reduction	Renewable installed capacity	Absolute GHG emissions (Scope 1, 2 and 3)	Scope 1 and 2 GHG emissions intensity
Target 2	Scope 1 and 3 GHG emissions intensity relating to integrated power	Scope 3 emissions reduction	Net carbon footprint upstream (Scope 1 and 2)	Quantity of recycled plastics per year	Renewable energy capacity installation
Target 3	Absolute Scope 3 GHG emissions relating to gas retail	% of women in management roles	Net GHG lifecycle emissions (Scope 1, 2 and 3)	-	Installed capacity of the electricity grid
Target 4	Renewable installed capacity percentage	-	Net carbon intensity (Scope 1, 2 and 3)	-	-
Target 5	Proportion of capex aligned with the EU taxonomy	-	-	-	-
SBTi validation	1.5 degrees, based on Scope 1, 2 & 3 net-zero targets	-	-	Well-below two degrees, based on Scope 1 & 2 near-term targets	Two degrees, based on Scope 1 & 2 near-term targets
Event	Missed 2023 carbon intensity target	-	-	-	Missed 2024 renewable energy target

Source: Company reports, Environmental Finance Data, SBTi Target Dashboard (accessed on 21 July 2025), IEEFA.
Note: Grey-shaded metrics are defined in frameworks but not used in SLB issuances. Purple-bordered metrics indicate the single or combined metrics that cover most of the company's total emissions. Teal-bordered metrics represent key material decarbonisation levers.

A closer look at potential externalities reveals the scale of transition risk. For example, emissions from Eni's sold products could have imposed social-economic damages of US$41 billion (€38 billion) in 2023, based on a social carbon cost of US$236 per $MtCO_2e$,[17] more than double the company's EBITDA. The significant transition risk could erode its credit profile over time through margin pressures, regulatory burdens and stranded asset liabilities, resulting in higher cost of capital.[18] Snam's yearly unreported transported emissions may represent a social cost of US$34 billion – 10 times its EBITDA – underscoring the company's role to address the emissions as Italy ramps up electrification towards net zero.

[17] International Foundation for Valuing Impacts. GHG Emissions Topic Methodology Implementation Guide. 6 November 2024.
[18] IEEFA. European oil: Navigating credit risk towards net zero. 13 March 2025.

Stepping Up

Recent SLBs have been closely watched. Enel had revealed a high chance of missing its 2023 target following its earnings release in March 2024,[19] while the price adjustment became clearer only once the miss was confirmed.[20] A2A announced in April 2025 that it had missed an SLB target. In this case, the SLB market appeared more efficient in pricing in the miss.[21] The implications of missing a target will be more nuanced as the SLB market develops. Still, the binary structure of most SLBs – focused on a single metric in a single year – is easy to price and understand. But this somewhat limits how well these instruments reflect any increase in transition risk.

As the market evolves, more nuanced performance-linked designs have the potential to reveal the seriousness of an issuer's sustainability strategy, executional capability, risk management and governance – factors that may translate into overall cost of debt benefits. Issuers facing elevated transition risk could get initial pricing benefits through credible SLB structures. Meanwhile, investors – which play a key role in promptly assessing transaction structures and issuer fundamentals – can gain downside protection against potential underperformance.

Slovenia Breaks Ground in Overlooked Sovereign SLBs

The nascent SLB market has largely been dominated by corporate issuers. While many European sovereigns are among the largest issuers of use-of-proceeds green bonds, they have been absent from the SLB space – until Slovenia issued the first European sovereign SLB in June 2025.[22] Before this, only Chile, Uruguay and Thailand had issued sovereign SLBs.

> **Slovenia's watershed issuance lays the foundation for sovereign SLBs as an asset class.**

In contrast, the green bond market has become more mature, with large-scale sovereigns and public entities providing depth and market liquidity while showcasing how their ring-fenced proceeds are used to promote environmental outcomes. SLBs are usually perceived as an alternative when the issuers have less readily available green project pipelines.

[19] IEEFA. Takeaways from Enel's sustainability-linked bonds performance targets. 25 March 2024.
[20] Anthropocene Fixed Income Institute. Enel SLBs: fortes fortuna juvat. 26 April 2025.
[21] Anthropocene Fixed Income Institute. A2A: SLB missed target confirmed. 24 April 2025.
[22] Republic of Slovenia. The Republic of Slovenia: EUR 1.0bn 3.125 percent 10-year Sustainability-Linked notes. 24 June 2025.

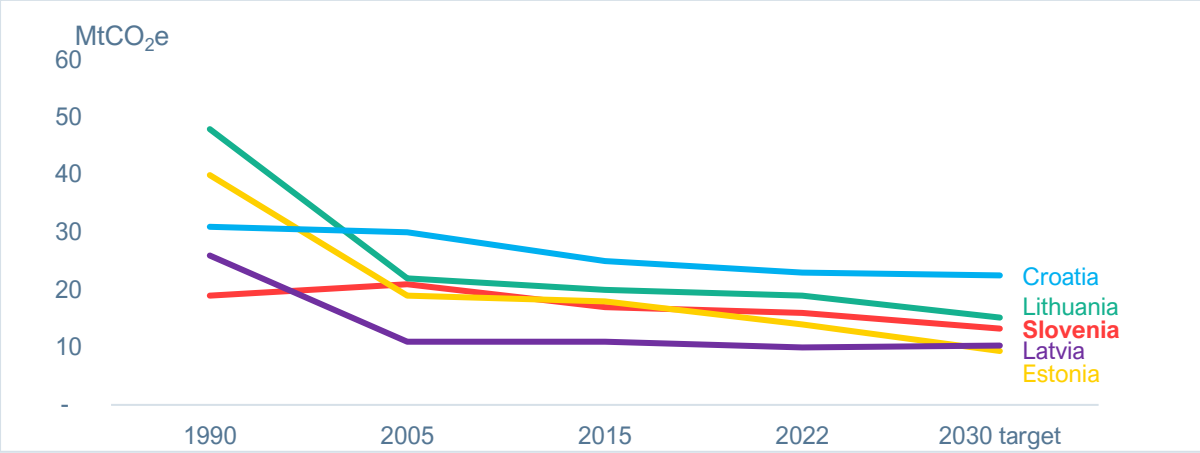
Slovenia's debut SLB marks a watershed moment for SLBs in Europe. The €1 billion 10-year note was met with strong investor demand, achieving 6.5 times oversubscription and allowing for tightened spreads. The deal lays the foundation for sovereign SLBs as an asset class.

The Slovenian government has established a comprehensive SLB framework, achieving some of the highest external verification scores from S&P Global. The sustainable finance strategy references the country's 2024 National Energy and Climate Plan, in line with EU energy and climate targets, covering GHG emissions, renewable share of energy consumption and overall energy consumption. The country's target emissions pathway is broadly in line with other similarly sized EU Member States.

However, Slovenia's SLB issue is only linked to its 2030 GHG emissions reduction target. The issuance will not directly account for decarbonisation measures such as energy efficiency and clean power development, nor will it capture the country's commitment to end coal generation by 2033.

The SLB still sets a credible example by aligning the country's incentives with system policy planning to drive national decarbonisation – unlike some sovereign green bonds, which may focus narrowly on transport or public infrastructure. It sets a clear framework to guide long-term decisions across ministries and sectors, supporting more integrated, accountable climate action. For investors, this presents an innovative tool to more closely monitor sovereign credits and climate transition risk while navigating the uncertainties induced by dynamic macroeconomic, political and social factors.

Figure 11: Slovenia's GHG Emissions Pathway Is in Line With Peers



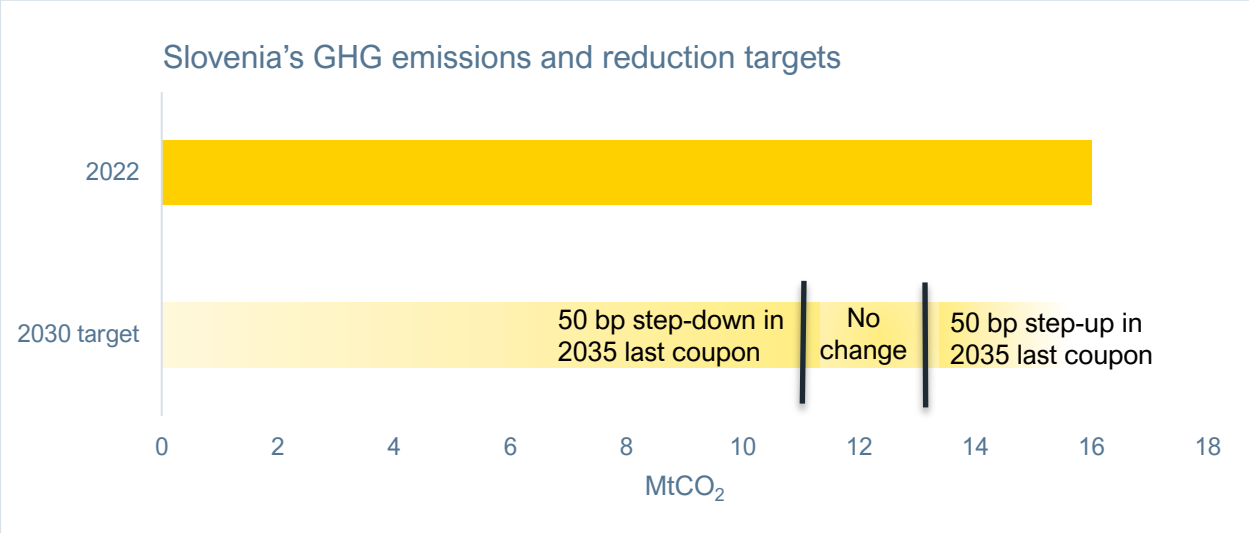
Source: European Commission,[23] IEEFA.

Slovenia's SLB features a tiered coupon structure, with a 50 basis point step-up if the country fails to achieve its 35% emissions reduction target by 2030 and a 50 basis point step-down if it exceeds a 45% reduction. The pricing mechanism somewhat sets a base case scenario, where 2030 GHG

[23] European Commission. Climate Action Progress Report 2023.

emissions could fall within the range of 11.3-13.4 $MtCO_2$. As such, the bond may trade on curve (no obvious premium), unless the market believes it is more likely that the target is missed or exceeded.

Figure 12: The Innovative Tiered Coupon Structure Could Set the Tone of a Base Case



Source: Republic of Slovenia Ministry of Finance.

Meanwhile, the three-year window between the target observation date and reporting performance outcomes may reduce pricing clarity. While this provides a buffer for data gathering and verification, it limits the bond's responsiveness to climate over or underperformance, delaying the market's ability to fully price in outcomes after the target year.

Slovenia's successful issuance may encourage other European countries to explore SLBs as a complementary tool to their green bond programmes. By translating national climate targets into market-based mechanisms, SLBs can align fiscal and environmental policies while increasing market discipline around sovereign transition risks. The tool may also attract more investors seeking transition instruments and diversified portfolios with credible pathways to net zero.

Sovereign sustainable finance strategies play a catalytic role in promoting overall sustainable finance market development.[24] Establishing the sovereign SLB asset class could spur corporate issuances, by building market liquidity, confidence and benchmarks. What's more, the design of SLBs – particularly their integration of fiscal and environmental policies – could provide more consistent guidance for corporates in setting their aligned sustainability targets, thereby encouraging further adoption of SLBs across the private sector.

[24] IEEFA. Green bonds down the drain: What Thames Water's debt crisis could mean for UK sustainable finance. 11 October 2024.

Large European Issuers Offer Potential for SLB Portfolios

While sustainability-linked structures are often more relevant for high-emitting sectors where decarbonisation incentives are most needed, energy transition risk is material across the economy, with exposure spanning across sectors. Moody's put US$5 trillion of its rated debt from 16 sectors in "very high" or "high" carbon transition risk in 2024.[25] In these sectors, linking emissions targets to instruments like SLBs provides both credible incentives and accountability.

SLB penetration among corporates remains limited. Sovereigns and financial institutions have untapped opportunities to deploy SLBs to support system-level decarbonisation. Issuers at varying stages of their transition may also choose to align their financing with their sustainability strategies, which can provide investors with clearer accountability.

Specifically in Europe, the regulatory landscape necessitates transition planning, supporting broader use of SLBs. The EU Climate Law establishes a legally binding path to climate neutrality by 2050, while the recent EU Clean Industrial Deal reinforces the link between climate ambition, energy security and industrial competitiveness. Large European issuers are well positioned to issue SLBs and present investors with portfolio allocation opportunities.

The Untapped SLB Issuers

Many European countries and companies already engaged in sustainable finance – primarily with an established green bond programme – are likely ready to expand in the SLB format. These issuers often have some form of climate targets in place, providing a strong foundation to credibly adopt performance-based structures. By incorporating those targets in SLBs, issuers can stretch their ambitions, such as with a coupon step-down mechanism that rewards overperformance, and be held accountable for measurable progress.

> **Wide adoption of SLBs among EU Member States could contribute to the bloc's 2050 climate neutrality, embedding accountability in climate and transition finance.**

European sovereigns have an opportunity to show climate leadership and signal policy credibility. Wide adoption of SLBs among EU Member States could contribute to the bloc's 2050 climate neutrality, embedding accountability in climate and transition finance. While Slovenia's landmark issuance sets a precedent, the country only accounted for 0.5% of EU emissions in 2022,[26] indicating large growth potential for SLBs as an asset class.

[25] Moody's. Heat map: Sectors with $4.3 trillion in debt face heightened environmental credit risk. 11 November 2024.
[26] European Commission. Climate Action Progress Report 2023.

Germany, which pioneered a twin green bond programme, could take a similar approach for SLBs,[27] in turn reinforcing its sustainable finance leadership. Unlike green bonds – which are structurally no different to their conventional twin – the pricing difference between SLBs and conventional bonds could reflect the market's assessment of whether the issuer will meet performance targets, considering both financial consequences (such as the size of coupon step-ups) and the materiality of KPIs.[28] While research has shown a small premium for SLBs,[29] a twin issuance programme could help with further studies around pricing behaviours and boost understanding of how climate transition risk is incorporated. More innovative structures, such as continuous tracked or progressive performance targets,[30] can further enhance credibility.

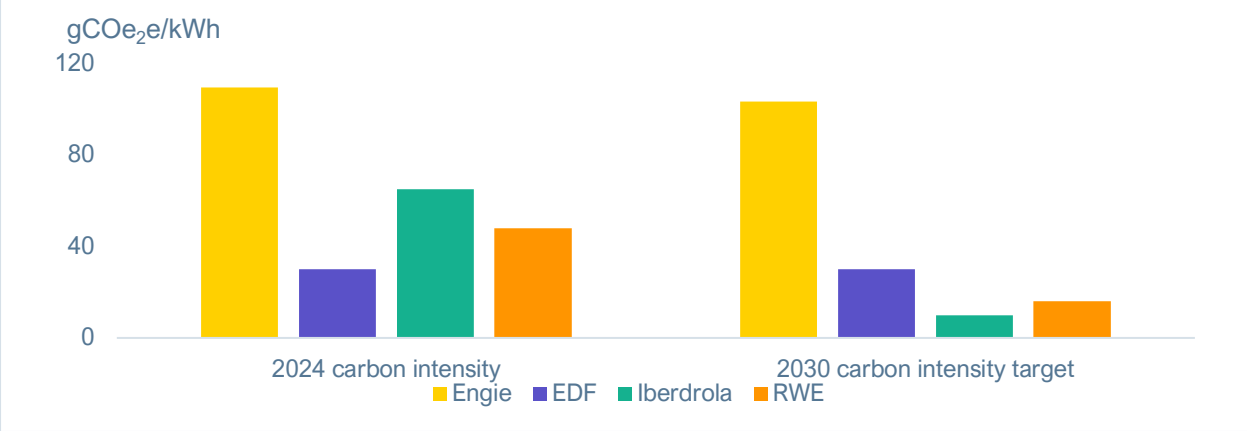
Also, public entities could have an important catalytic impact on overall market development, stimulating participation from issuers across different sectors and transition stages. While the EU missed the opportunity to drive the uptake of its European Green Bond Standard (EUGBS), which took effect in December 2024,[31] the bloc can still lead by example in climate-linked bond issuances and help shape the development of SLB guidelines.[32]

European financial institutions' participation in SLBs is far limited compared to green bonds. The European Banking Authority[33] and other prudential authorities increasingly emphasise the integration of transition planning into risk management, underscoring the need for more transparent and credible commitments and measures. SLBs can hold financial institutions' transition planning processes accountable.

In the corporate space, for example, major European utilities have long been users of green finance to support renewable energy expansion,[34] but they remain absent from the SLB market, except for Enel. Among the largest players, Engie, EDF, RWE and Iberdrola have diverse power generation mixes. They play an essential role in decarbonising Europe's power sector. The SLB format is fit for purpose to align with the EU's goal of cutting GHG emissions by at least 55% by 2030, compared to 1990. It also improves comparability for investors tracking progress against companies' 2030 targets.

[27] OMFIF. Doubling down on 'twin' sustainability-linked government bonds. 5 September 2024.
[28] Mariani, M., D'Ercole, F., Frascati, D., & Fraccalvieri, G. Sustainability-linked bonds, corporate commitment and the cost of debt. Research in International Business and Finance. Volume 74. February 2025.
[29] Poggensee, J. The pricing of sustainability-linked bonds on the primary and secondary bond markets. Journal of Asset Management. 4 February 2025.
[30] Erlandsson, Ulf. Transition linkers. 30 October 2024.
[31] Bloomberg. EU's Green Bonds Will Avoid Bloc's Own 'Gold Standard' Rules. 16 January 2025.
[32] According to the European Green Bond Regulation (Regulation (EU) 2023/2631), the European Commission is obliged to publish a report accompanied by a legislative proposal, where appropriate, on the need to regulate SLBs by late 2026.
[33] European Banking Authority. The EBA publishes its final Guidelines on the management of ESG risks. 9 January 2025.
[34] IEEFA. Europe's clean power leaders: How green financing is enabling renewable growth. 20 June 2024.

Figure 13: 2030 Climate Targets Among Europe's Major Utilities



Source: Company reports, IEEFA.

Combined Sustainable-Linked Use-Of-Proceeds Mechanism

IEEFA believes green bonds and SLBs should not necessarily be viewed as mutually exclusive. Leading European issuers can – and should – also consider combining sustainability-linked and use-of-proceeds structures. Several issuers are already laying the groundwork for this approach. For example, SLB champion Enel initially issued green bonds but has continued to use SLB proceeds to fund green activities that would have qualified for a credible green bond framework. Meanwhile, A2A stands out as a frontrunner in adopting the EUGBS,[35] and Snam has also issued bonds in accordance with the standard.[36] These examples demonstrate that issuers are using both green bonds and SLBs to reflect their evolving sustainability strategies.

But most issuers continue to issue green bonds and SLBs separately, with Verbund's 2021 issuance being a rare but groundbreaking precedent for combined green SLBs.[37] The recent launch of the EUGBS presents an opportunity to introduce sustainability-linked European Green Bonds. These would add a sustainability performance structure to use-of-proceeds green bonds aligned with the EUGBS, and could emerge as the best-in-class model. The dual lens of the combined structure provides unique benefits in credibility, accountability and versatility, and could spur market innovation at a time when the SLB market needs a renewal. These benefits include:

1. **Avoid siloed green issuance**. Linking use of proceeds with company-level KPIs strengthens the connection between project-level financing and broader corporate transition goals. This in turn lowers the risk of immaterial allocated proceeds, especially when they are small relative to the issuer's capital structure.

2. **Enhance impact accountability**. Setting issue-level KPIs allows for better alignment with the expected outcome and impacts of the use of proceeds. This moves beyond input-focused

[35] A2A. A2A, first European Green Bond placed on the market. 23 January 2025.
[36] Snam. Snam successfully places its first European Green Bond of € 1 billion with a 7-year maturity. 24 June 2025.
[37] Natixis. Verbund issues world's first bond combining Use-of-Proceeds earmarking and KPI-linking mechanism. 29 April 2021.

investments by introducing clear, dynamic safeguards of impacts, calibrated through a tailored chain of metrics, from output, outcome to impact.

3. **Prevent proceed misalignment**. Earmarking SLB proceeds with green-eligible activities ensures funds are not used to support counterproductive investments or activities that risk prolonging carbon lock-in. This discipline is a vital part of a credible transition plan.

Table 4: Sustainability-Linked Use-Of-Proceeds Bonds Are a Powerful Combination

Features	Green bonds	SLBs	Combined green SLBs
Use of proceeds	Proceeds earmarked for specific green projects/assets (such as EU taxonomy-aligned activities for European Green Bonds)	No restriction; proceeds used for general purposes	Same as green bonds (potentially eligible for European Green Bonds)
Performance metrics	No performance targets	Linked to sustainability KPIs with financial bond characteristics	Linked to sustainability KPIs with financial bond characteristics (could be corporate- or issue-level KPIs)
Pricing premium vs conventional bonds	Reflect investor willingness to pay for green credentials	Reflect expected gain/loss of whether the targets are achieved or not (may incorporate transition risks via KPIs)	May reflect green premium or KPI-based adjustments or both
Lack of pricing premium vs conventional	Reflect structurally no difference to conventional bonds	May reflect high likelihood of KPI achievement or small financial construct	Same as SLBs
Issuer candidate	Issuer with credible project pipeline	Issuer with credible transition plan	Issuer with credible transition plan more clearly backed by strong project pipelines
Structure complexity	Simple, no structural feature	Typically one (or two) KPI(s) tied to one financial mechanism (such as coupon step-up); potential to add layers	Same as SLBs – more sophisticated design possible if needed
Overall cost of capital benefits/"green halo"	Potentially established through commitments, capex pipelines, green asset delivery and governance	Potentially established through commitments, actionable plans, plan delivery and governance	Enhanced halo possible by combining strong plans and green asset delivery
Investor appeal	Green bond or sustainable investment funds	Investors seeking risk hedging; portfolio aligned with decarbonisation trajectory	Green bond or sustainable investment funds with enhanced accountability
Issuer accountability	Eligible green projects and impact reporting	Achievement of KPIs (such as failures triggering penalty)	Dual accountability: project impact and issuer performance against targets; lower risk of greenwashing or carbon lock-in
Environmental impacts	Activity-level investments; green assets measured by defined impact metrics	Company-level decarbonisation progress	More versatile and impact-focused: green assets invested and delivered with better accountability, linking to transition plan

Source: IEEFA.
Note: Teal-bordered features highlight the enhanced potential benefits for issuers and investors.

Market innovation is not entirely absent. Nordea has issued a sustainability-linked loan bond[38] – a precedent instrument with proceeds earmarked for sustainability-linked loan disbursement, uniquely structured to reflect the bank's role in incentivising companies to decarbonise. This is technically neither a green- nor sustainability-linked bond, but it paves the way for further innovation. Adopting a combined sustainability-linked use-of-proceeds structure would mean performance targets can be set on the amount of sustainable-linked loan disbursement. Similarly, KPIs can be linked to green loan exposure and/or to firm-wide targets, such as reducing fossil fuel exposure, to form a cohesive transition plan.

Conclusion: Europe's Opportunity

Europe is uniquely positioned to lead the sustainable finance market by driving the incorporation of nuanced, credible transition targets into debt financing strategies. The EU's sustainable finance architecture is anchored by science-based targets, actionable transition plans, a taxonomy for green activities and robust governance. With its comprehensive regulatory framework, intervention of prudential authorities and a deep investor base increasingly focused on climate risks, the region offers a strong ground for SLB innovation with varied and nuanced formats.

As European issuers embrace rigorous sustainability metrics and face investors' scrutiny amid a dynamic operating environment shaped by climate-related factors, there is potential for SLBs to grow in liquidity and maturity. As investors assess transactions more closely, they will play a critical role in driving market efficiency and encouraging nuanced target setting and financial structures. This will in turn help a range of market participants navigate the complexity of climate-related financial risks.

[38] Nordea. Nordea issues innovative bond to fund sustainability-linked loans. 14 September 2022.

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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