Airport Sustainability-Linked Bonds: clear for takeoff

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It is several years since Greta Thunberg sailed to New York, to highlight the environmental impact of air travel.[1] After a pandemic-caused respite, air traffic volumes are predicted to recover in 2023, and double by around 2040.[2] For this form of transport to become sustainable, transition technologies are urgently needed.

"In February, a review by the Royal Society[3] concluded that 'there is no single, clear, sustainable alternative to jet fuel able to support flying on a scale equivalent to present day use.' To meet the UK's current aviation demand with green hydrogen would require about three times the country's 2020 wind and solar electricity generation. To meet it with crops, like oilseed rape, would require more than half the country's agriculture land".[4]

There is a significant need for capital to develop sustainable air technologies. Airports have a role to play, as facilitators of air traffic. They can influence aircraft usage and fuel choice and be the intermediary between airlines and their passengers.

In this note we review airport ESG-labelled bond issuance, and specifically recent Sustainability-Linked Bonds (SLBs). We assess the deals to see if they have been effective at raising necessary transition capital, and supporting ambitious sustainability targets for airports.

We offer these key takeaways for investors:

- Air travel, which accounts for 7% of UK emissions[4] and is projected to grow, does not yet have an easy technology fix. **Investment is needed to find a solution.**
- **Airport green bonds have been much criticised for greenwashing.** In general, they have been used to expand airports using sustainable methods, supporting growth in air travel. **They have not addressed aircrafts that are the dominant source of emissions.**
- **There has been significant recent issuance of airport SLBs from European, Latin American and Chinese companies.** This shows a promising step towards raising capital to transition air travel, **especially where KPIs are linked to Scope 3 emissions.**
- **The recent Heathrow bond used ambitious KPIs, covering absolute 'in the air' emissions.** AFII option pricing calculated a 7.5bp value to the step-up coupon, which could deliver attractive financing rates for issuers committing to ambitious sustainability plans.

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[1] "Greta Thunberg sets sail for New York on zero-carbon yacht", The Guardian, 24 Aug 2019.
[2] "Polishing my crystal ball: airline traffic in 2050", The International Council on Clean Transportation", 31 Jan 2022.
[3] "Net zero aviation fuels: resource requirements and environmental impacts", The Royal Society, 28 Feb 2023.
[4] "Cait Hewitt: 'I hope the era of aviation exceptionalism is over", FT, 24 Jul 2023.

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The climate impact of airports

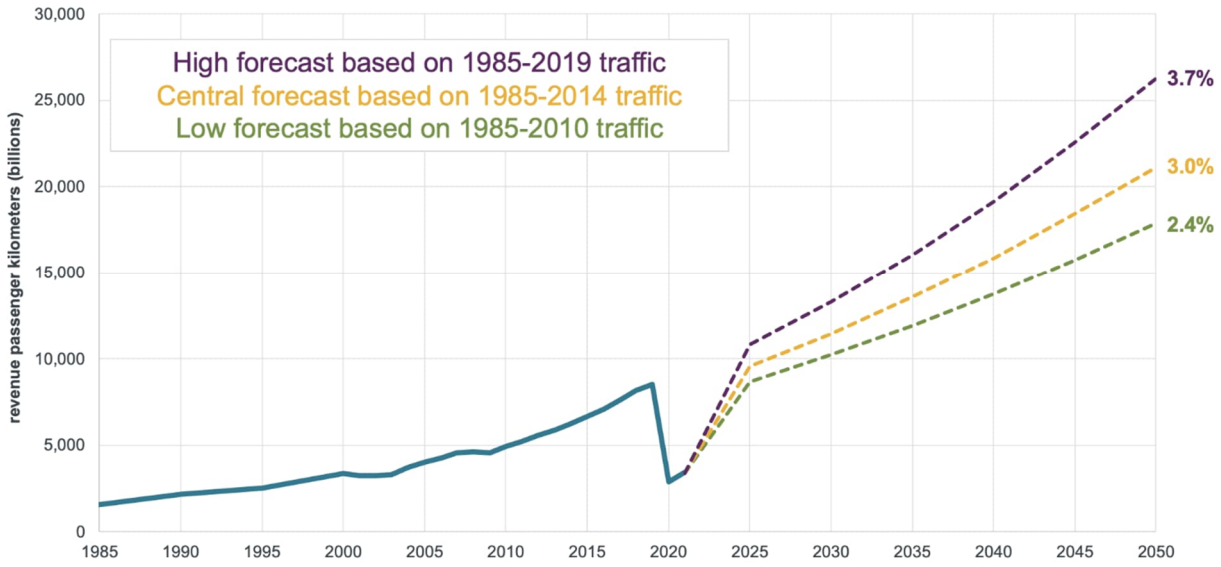
Airports are buildings designed to support passenger and freight air travel. Their direct climate impact is through construction, energy usage, and transportation, both through their day-to-day operations as well as expansion.

The Aviation Environment Federation (AEF) note that both the construction and operational phases of 'terminal & ground operations' have a negative impact on biodiversity,[5] whilst the UK government's own Airports National Policy Statement considers airport expansion as having detrimental effects on soils, biodiversity, water, and air quality.[6]

Their impact can be reduced by methods established in other sectors. Buildings can be insulated, energy can be generated through renewable sources, and low emissions vehicles can be used around sites.[7]Airports will also find themselves exposed to increased physical risks from climate change, including floods, storms and turbulence,[8] and so investment in adaption will be needed.

It is airports' role in facilitating air travel however that is most significant when considering their climate footprint. Air-based Scope 3 emissions are estimated as 95% of total emission for Heathrow,[9] and aviation accounts for 2.5% of global CO_2.[10] Air travel was significantly reduced during the pandemic lockdowns, but has nearly recovered, and is projected to grow strongly over the next two decades, with a compound annual growth rate of between 1.8% and 4.2%.[10]

Figure 1. Air traffic projections. Source: The International Council on Clean Transportation, 31 Jan 2022.



[5] "What are an airport's impacts?", Therivel, R., Aviation, the environment and planning law, online content published by AEF between 2008 and 2009.
[6] "Appraisal of Sustainability: Airports National Policy Statement", Department for Transport, June 2018.
[7] "Airport Carbon Emissions Reduction", Federal Aviation Administration, 14 Nov 2022.
[8] "Airlines prepare for blizzard of climate challenges", Financial Times, 30 Dec 2018.
[9] "Heathrow Airport Sustainability-Linked Bond Framework Assessment", DNV, 29 Jun 2023.
[10] "Climate change and flying: what share of global CO2 emissions come from aviation?", Our World In Data, 22 Oct 2020.

In 2019 the United Nations launched its Corsia scheme, aiming to ensure that even though passenger numbers are projected to double to 2037, net emissions after offsets will not rise above levels from 2020.[11] There is criticism on the effectiveness of some eligible offsets, but these projections demonstrate how polluting the business-as-usual scenario will be.

Airlines remain a focus for investors committed to net zero. The Climate Change Committee, an independent body, advised a recent UK government consultation that no net increase in airport expansion should be allowed, following previous warnings that the sector could consume as much as two-thirds of the UK's 1.5°C remaining carbon budget.[12] The Airport Council International (ACI) has set a global target for member airports to be net-zero by 2050,[13] though this target only includes Scope 1 + 2 emissions, which is not sufficient to entirely reduce an airport's climate impact.[15] This puts the trajectory of air travel demand on a collision course with the decarbonisation ambitions of airports, who would need to expand in order to service increased flights.[14]

While there are other sectors such as energy with much greater climate impact today, air traffic is projected to double in as little as fifteen years from 2019. In the absence of demand reduction, decarbonisation strategies will be key in reducing the climate impact of this activity.

Airports have a role to play, as an essential player in the air traffic value chain.

Transition pathway

There are a few existing technologies which are being considered as levers in the decarbonisation pathway, and airports play a role in encouraging their adoption.

Operational efficiency can drive reduced fuel usage. Airports can optimise landing and take-off cycles or utilise Continuous Descent Operations (CDO),[15] a procedure already put in place at Brussels Airport.[16]

Aircraft can be upgraded to be more efficient or use a fuel mix which includes some proportion of Sustainable Aviation Fuel (SAF). Airports can charge differentiated prices to carriers based on these factors; a measure considered by Sweden for example.[17]

Development of SAF is not completed. Zero-carbon aircraft, using hydrogen, are also still in development. These new technologies will be critical to achieving net zero.

In 2020, UNPRI released a joint statement with Climate Action 100+ in which investors emphasised the importance of the sector, and expectations of improved net zero emissions plans.[18] We note

[11] "Corsia: The UN's plan to 'offset' growth in aviation emissions", CarbonBrief, 4 Feb 2019.
[12] "Backers of UK airport expansion are part of UN green investment scheme", The Guardian, 28 Oct 2021.
[13] "Long Term Carbon Goal Study for Airports Report, 2021", ACI, 8 Jun 2021.
[14] "Air Traffic Expansion is the biggest challenge facing airports", ADB Safegate, 16 Aug 2017.
[15] Effectively tackling Scope 3 emissions is the key to decarbonizing airports", ICF, 27 Jul 2022.
[16] See "Continuous descent operations (CDO)", Brussels Airport Traffic Control (BATC) for more information.
[17] "Sweden to increase airport fees for high polluting aircraft", Regional Gateway, 24 Mar 2021.
[18] "Aviation companies must set net-zero emissions plans, say investors representing nearly $6 trillion in AUM", UNPRI, 12 Mar 2020.

that Heathrow, which had set a target for net zero, only aims to reduce emissions from aircraft by 80%, and achieve the final 20% through carbon removal.[19]

The Airport Council International estimates that improvements to airport infrastructure will cost US $2.4trn in capital investments to 2040,[20] to support passenger growth and improve sustainability and resilience.

Existing technologies such as improving efficiency or sustainable fuel are unlikely to deliver full decarbonisation. Hydrogen-powered aircraft and emissions removal will be needed. These technologies will require capital to develop.

ESG-labelled debt issuance in the airport sector

ESG-labelled debt includes bonds where proceeds are ringfenced for specific green, sustainable or social investments (GSS), and bonds with a payment linked to a sustainability objective (SLB). Mexico City Airport Trust first issued a green bond in 2016 and since then there have been a selection of issuances in the airport sector, as detailed in Table 1.[21]

These green bond issuances have not been without controversy. Bonds from Mexico City Airport Trust are the closest thing to a 'thematic default' in the green bond market.[22] Bonds were issued in 2016 and 2017, however in Oct 2018 construction of the airport was halted following a public referendum. A portion of the bonds were bought back at par, however the remaining bonds lost their green assessment.[23] It is unclear if this fed through into all investment decisions. Bloomberg holding analysis shows for example that MEXCAT 5.5% 47s is still a holding in a selection of ESG or sustainable bond funds, including iShares JP Morgan ESG USD EM Bond UCITS ETF.[24]

The second largest issuer, Hong Kong Airport, has also been criticised for greenwashing in its green bond issuance.[25] The criticism revolves around whether expanding an airport, and implicitly increasing volumes of air traffic, can ever be consistent with sustainable objectives.

Analysis of Swedavia's SEK1bn 1y green bond issued in 2019 highlighted the importance of context when understanding the impact of the proposed buildings investment funded by the bonds. Even though in isolation the criteria would seem positive, given the buildings will support increased air travel, the overall investment received a lower rating.[26]

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[19] "Heathrow Sustainability-Linked Bond Framework", Heathrow, Jun 2023.
[20] "ACI World reveals capital expenditure needs for recovery and long term growth" Airport Council International, 30 Jun 2021.
[21] We determine the airport sector as issuers with Industry_Subgroup equal to "Airport Develop/Maint".
[22] We defined a 'thematic default' as one where the sustainability performance of an issuer is not achieved. We explore this topic more in "Understanding dynamics between sustainable and traditional debt", AFII, 26 Jan 2023.
[23] "Mexico City Airport: The green bond that was no longer", Natwest, 16 Jan 2019.
[24] "iShares J.P.Morgan ESG $ EM Bond UCITS ETF", iShares, accessed 17 Jul 2023.
[25] "High-flying greenwashing around a new green bond for Hong Kong Airport", Reclaim Finance, 4 Jan 2022.
[26] "How Green are Airport Green Bonds?", Nordsip, 19 Dec 2019.

Table 1. Green, sustainable, social and SLB issuance in the Airport sector, ordered by total. Source: Bloomberg, accessed 13 Jul 2023, and "Mexico City Airport: The green bond that was no longer", NatWest, 16 Jan 2019.

Issuer	Ticker	Country of Risk	Total Green issuance ($bn)	Total Social issuance ($bn)	Total SLB issuance ($bn)	Total ESG-labelled issuance ($bn)
MEXICO CITY AIRPORT TRUST (*)	MEXCAT	MX	6.0			6.0
AIRPORT AUTHORITY HK	HKAA	HK	2.0			2.0
ROYAL SCHIPHOL GROUP NV	LUCSHI	NL	2.0			2.0
CAPITAL AIRPORT GROUP	CAPAPT	CN	1.3		0.3	1.6
AEROPORTI DI ROMA SPA	ADRIT	IT	0.4		1.0	1.4
HEATHROW FUNDING LTD	HTHROW	GB			0.7	0.7
GRUPO AEROPORTUARIO DEL-	GAPBMM	MX	0.1		0.4	0.5
INDIA AIRPORT INFRA	INAPIN	IN	0.5			0.5
INCHEON INTL AIRPORT	KORAIR	KR	0.3	0.1		0.4
SICHUAN AIRPORT GROUP	SCAIRP	CN	0.4			0.4
GPO AEROPUER CENTRO NORT	GACENO	MX	0.1		0.3	0.3
NEW KANSAI INTERNATIONAL	KANAIR	JP		0.3		0.3
HZ XIAOSHAN INTL AIRPORT	HZXSIZ	CN	0.3			0.3
CHONGQING AIRPORT	CQAIRP	CN	0.3			0.3
EASTERN AIRPORT GRP CO	NJLUKO	CN	0.2			0.2
SWEDAVIA AB	SWEDAV	SE	0.1			0.1
CENTRAL JPN INTL AIRPORT	CENAIR	JP		0.1		0.1
YUNNAN AIRPORT GROUP	YNARPT	CN			0.1	0.1

There has been significant ESG-labelled issuance in the airport sector. Green bonds have struggled to provide assurances to investors on their environmental credentials; in part because they invest in known technologies alongside air traffic growth. More capital is needed to support investment in the new technologies that will be needed for full decarbonisation.

SLB issuance

Sustainability-Linked Bonds, where financing rates are linked to sustainability outcomes rather than investment inputs, are a useful tool in hard-to-abate sectors.[27] They can also give investors more confidence in the impact of their capital, addressing greenwashing concerns.[28]

The first SLB was issued by an Italian utility company in late 2019, and the Aeroporti di Roma, the management company for two Rome airports, issued the first airport SLB in Apr 2021. Table 2 gives full details on SLB usage in the sector.[29]

[27] For a side-by-side comparison of issuances of green bonds and SLBs please see "SLBs: complementary, my dear Investor", AFII, 13 Apr 2023.
[28] These themes are discussed in more details in our analysis of the Japanese transition bond programme in "Sovereign SLB: an option for Japan's transition", AFII, 15 Jun 2023.
[29] We note SLBs have also been used by the Airline industry as covered in "Air France-KLM: come fly with SLBs", AFII, 9 Jan 2023, and a case study on Etihad in "Sustainability-Linked Bonds: alternative steps", AFII, 23 May 2023.

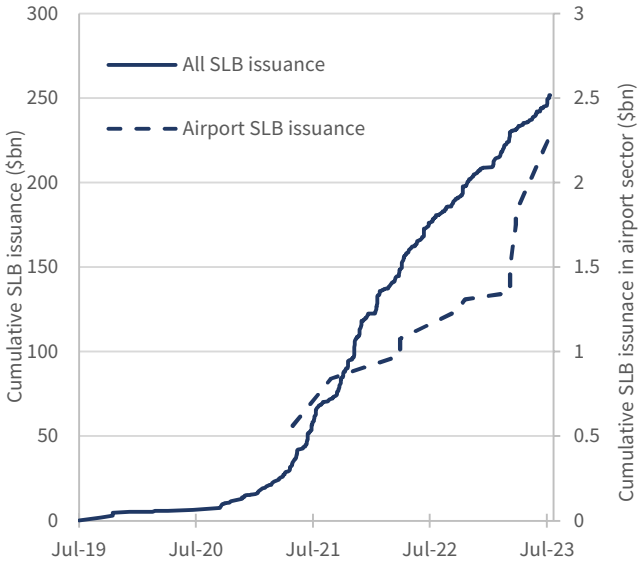
Table 2. SLB issuance in airport sector. Source: Bloomberg, accessed 13 Jul 2023.

Issuer	Ticker	ISIN	Issue Date	Maturity Date	Issue Amount (bn)	Currency
AEROPORTI DI ROMA SPA	ADRIT	XS2337326727	30-Apr-21	30-Jul-31	0.50	EUR
CAPITAL AIRPORT GROUP	CAPAPT		27-Aug-21	27-Aug-26	2.00	CNY
GPO AEROPUER CENTRO NORT	GACENO	MX91OM000050	31-Mar-22	22-Mar-29	2.30	MXN
GPO AEROPUER CENTRO NORT	GACENO	MX91OM000068	31-Mar-22	25-Mar-27	1.70	MXN
GRUPO AEROPORTUARIO DEL-	GAPBMM	MX91GA0000E0	26-Sep-22	21-Sep-26	2.76	MXN
YUNNAN AIRPORT GROUP	YNARPT	CND10005RGP7	19-Oct-22	19-Oct-25	0.50	CNY
GPO AEROPUER CENTRO NORT	GACENO	MX91OM000084	10-Mar-23	24-Jul-26	0.64	MXN
GPO AEROPUER CENTRO NORT	GACENO	MX91OM000076	10-Mar-23	01-Mar-30	2.56	MXN
GRUPO AEROPORTUARIO DEL-	GAPBMM	MX91GA0000F7	27-Mar-23	18-Mar-30	4.28	MXN
GRUPO AEROPORTUARIO DEL-	GAPBMM	MX91GA0000G5	27-Mar-23	23-Mar-26	1.12	MXN
AEROPORTI DI ROMA SPA	ADRIT	XS2644240975	10-Jul-23	10-Jul-33	0.40	EUR
HEATHROW FUNDING LTD	HTHROW	XS2648080229	11-Jul-23	11-Jul-33	0.65	EUR

After a slow start, issuance growth in the airport sector has outpaced the broader market pace of growth in 2023, as shown in Figure 2. Indeed, nearly 4% of total SLB issuance in 2023 has been from the airport sector.

Two Mexican airports have brought their second issuances, both two-tranche deals, in Mar 2023. This was followed by two European airports bringing deals in July. The specific details of the bonds, and option pricing, are covered as case studies at the end of this document.

Figure 2. Cumulative issuance for SLB market compared to airport sector. Source: Bloomberg, accessed 17 Jul 2023.



For a sector which has struggled with greenwashing concerns over its use of green bonds, it is positive to see an accelerated take-up of SLBs. These bonds should increase transparency around sustainability objectives, and hold issuers to account to deliver the promised improvements.

Case study: Heathrow

Heathrow, the operator of the largest UK airport, issued its first SLB on 5 Jul 2023. The bond appears to have been well-received in the media.[30] We analyse the structure, and price the step-ups, to understand its potential impact on reducing emissions in the airport sector.

Bond details

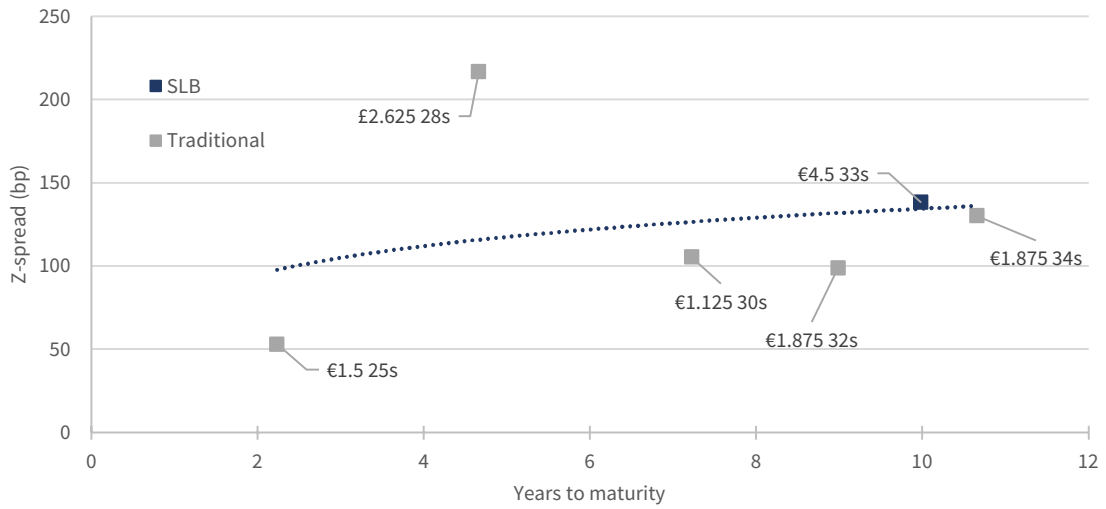
Heathrow's inaugural Sustainability-Linked Bond had a €0.65bn notional, 10y maturity and 4.5% coupon. The deal was reported as 2.8x oversubscribed,[31] which is above the average for GPB bonds of 1.82x.[32]

The bond referenced two Key Performance Indicators (KPI). Observation date was Dec 2030, with a 25bp step-up coupon payable on missing each one. The coupon is annual, so the increased coupon would accrue from Jul 2031, with four annual increased coupons payable.[33] On a discounted basis and using an illustrative 50% probability of receiving the step-up, we calculate the total present value of increased coupon to be 0.76%. This is below the required 1% to be classified as a "Greenback" SLB, the AFII standard for material SLB structures.[34]

Figure 3 shows current pricing on Heathrow's outstanding EUR bonds, where the new SLB looks wide of the curve, and specifically wider than a longer-dated vanilla bond, HTHROW 1.875% 34s.

The SLB was issued at mid swaps + 148bp and has since tightened around 8bp. The vanilla bond was pricing at 136bp the day before the deal, and has since tightened 3bp, so there has been some compression. The new SLB has a significantly higher coupon than all existing debt, which gives it a higher cash price; the SLB was issued at 99.59% whereas the 34s are around 79%. Low coupon bonds, with a lower cash price to fund, tend to be preferred by investors and therefore trade at a tighter spread, which could explain the apparent inversion of the spread curve.

Figure 3. Heathrow EUR bond z-spreads. Source: Bloomberg, accessed 17 Jul 2023.



[30] "'Others will follow' innovative Heathrow Scope 3 sustainability-linked bond", Environmental Finance", 10 Jul 2023.
[31] Details from Bloomberg, accessed 17 Jul 2023.
[32] Using data from Bloomberg, issuance 1 Jan 2023 to 24 Jul 2023, currency of GBP and size greater than $0.5bn.
[33] Information from Final Terms and Base Prospectus available at Heathrow Funding Limited's web page on the LSE.
[34] For full details please see "Greenback SLBs: an impact standardisation proposal", AFII, 10 May 2023.

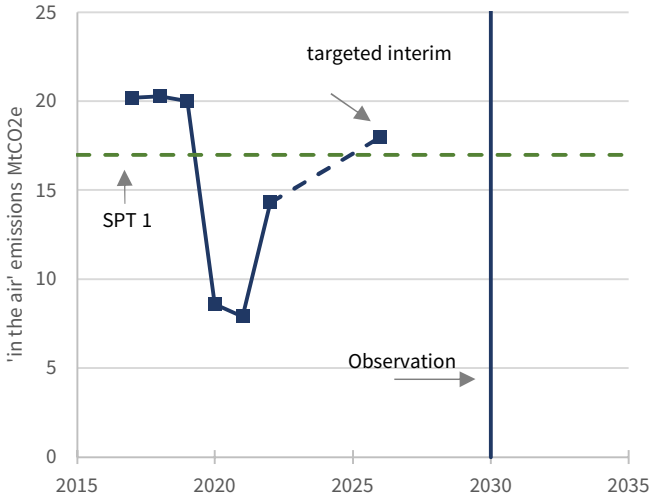
Sustainability Key Performance Indicators

The Heathrow SLB references two Key Performance Indicators (KPIs). The first is absolute 'in the air' emissions (Scope 3), and the second is absolute 'on the ground' emissions (Scope 1, 2 + 3).

KPI1

The first KPI for the Heathrow's debut SLB targets a reduction in the absolute level of 'in the air' carbon emissions (Scope 3) of 15% by the end of 2030, compared to a 2019 baseline. 'In the air' emissions include Scope 3 emissions coming from aircraft in their landing & take-off cycles, as well as whilst cruising (departing flights only, which is consistent with the Airport Cooperative Research Program (ACRP) guidance on preparing airport GHG emissions inventories).[35] Figure 4 presents the SPT of reducing these emissions by approximately 3MtCO$_2$e along with the historic data provided in the SLB framework.

Figure 4. Heathrow 'in the air' emissions historic and targeted levels. Source: Heathrow Sustainability-Linked Bond Framework, June 2023.



As a result of the reduction in air travel caused by the pandemic, 'in the air' emissions fell sharply in 2020 and 2021, but rebounded in 2022, albeit below the targeted level. Key to understanding the ambition level is appreciating that under a business-as-usual (BAU) pathway (as indicated in the SPO of the framework), emissions are projected to return to pre-pandemic levels by 2030.

Heathrow aims to meet this KPI through three solutions: airspace modernisation and operational efficiency, new conventional aircraft, and switching to new fuels. A 15% reduction is a small step towards net zero but given the limited degree of influence Heathrow has over these emissions, the target looks ambitious. For example, SAF plays a large role in the aviation industry's plans to transition, yet the technology has a far higher cost than conventional fuel and isn't ready to be meaningfully scaled up.[36]

[35] "Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories", National Academies of Sciences, Engineering and Medicine, 2009.
[36] "Green jet fuel is here – so why are airlines not using it?", CNN, 26 Apr 2022.

KPI2

The second KPI is a reduction in the airport's 'on the ground' emissions of 46.2% by the end of 2030, again compared to a 2019 baseline. 'On the ground' emissions include Scope 1, 2 + 3, covering emissions from surface access to the airport, the supply chain of the airport, airport vehicles, and buildings and infrastructure of the airport. Of these different sources, 'surface access' is the largest constituent, accounting for 4% of the airport's overall emissions in 2019, again evidencing the importance of the Scope 3 emissions of airports.

Figure 5. Heathrow 'on the ground' emissions historic and targeted levels. Source: Heathrow Sustainability-Linked Bond Framework, June 2023.

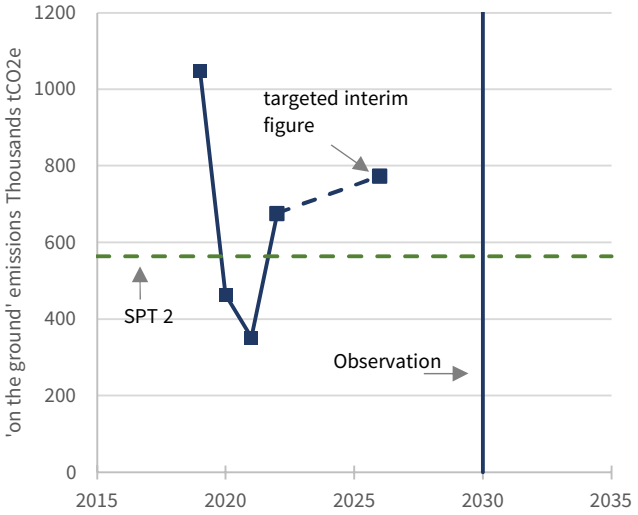


Figure 5 presents the SPT of reducing these emissions by approximately 483,000 tCO2e by the end of 2030, alongside the historic data provided by the SLB framework. Only four datapoints are available for total 'on the ground' emissions but it is clear that following a sharp decrease in 2020 and 2021, the trend of these emissions is upwards as aviation continues to recover.

Option pricing

We will now use the AFII option pricing model, a Black-Scholes framework, to price the step-up feature of this SLB.[37] Given the volatility in passenger numbers of the recent few years, driven by pandemic travel restrictions, it is hard to imply an unadjusted drift for these data series. It should be noted that the Second Party Opinion (SPO) on the financing framework predicts rising levels of both KPIs under a BAU trajectory,[38] which presents a different perspective that historic trend analysis, where SPT1 is already achieved.

The fact that KPI1 includes 'in the air' emissions does present best-in-class and is not something we have seen from any other airport or airline SLB. Peer analysis in the SPO shows that only one out of the four peers have a reduction target on 'in the air' emissions, at a level which is not SBTi validated. This suggests the ambition level is high. For pricing purposes, we will consider a 75% probability of missing the target.

[37] For full details please see "An option pricing approach for sustainability-linked bonds", AFII, 8 Nov 2022.
[38] BAU trajectories are included in "Heathrow Airport Sustainability-Linked Bond Framework Assessment", DNV, 29 Jun 2023. It should be noted that the historic data points do not seem quite to agree with the Heathrow Sustainability Report, and there is no alternate source given.

KPI2 covers 'on the ground' Scope 1, 2 + 3 emissions. While the relative reduction is higher, the technologies this reduction is reliant on are more established, for example electric road transportation. Heathrow reports in its financing framework a higher degree of influence over these emissions (an average of 7/10 compared to 4.25/10 for KPI1),[39] which should also make this target more achievable. We will assign a 25% probability of missing the target.

Table 3 shows the option pricing of the Heathrow SLB using these parameters. The total running price is 7.5bp, which would imply that the SLB could trade 7.5bp tighter than an equivalent vanilla bond.

Table 3. Heathrow SLB option pricing. Source: AFII.

	SPT1	SPT2	Total
Probability of missing target	75%	25%	
Upfront value of option	0.57%	0.19%	0.76%
Running value of option	0.056%	0.019%	0.075%

Summary

The structure of this SLB is strong, chiefly due to its inclusion of all Scope 3 emissions.[40]

Demand and pricing seemed to be disappointing, however this must be considered amongst the backdrop of a very challenging few years for airline investors, which may have seen them move away from businesses connected to this sector.[41]

A strong sustainability performance, producing a strong financial return from this bond, could attract more environmentally-minded investors back to the sector.

Case study: Rome

Issuance details

Aeroporti di Roma (ticker ADRIT) has issued two SLBs to date. The first, issued in April 2021, had a €0.5bn notional, 10y maturity and 1.75% coupon.[42] The second, issued two days before the Heathrow SLB in July 2023, had a €0.4bn notional, a renewed 10y maturity, and a 4.875% coupon.[43] The first SLB from Aeroporti di Roma was reported at the time as being 5x oversubscribed,[44] whilst the second was reported as being just under 5x oversubscribed,[45] both of which are higher than the average for EUR deals in 2023 of 2.56x,[46] and suggest higher investor demand than the Heathrow structure.

[39] "Heathrow Sustainability-Linked Bond Framework", Heathrow, Jun 2023.
[40] Part of a positive trend in the SLB market as described in "Time is ripe for Scope 3 sustainability-linked bond growth", says NatWest", Environmental Finance, 19 Jul 2023.
[41] "Airlines will return to profitability in 2023 after three-year slump, industry body says", CNBC, 6 Dec 2022.
[42] Final terms for the SLB issued in Apr 2021 can be found here.
[43] Final terms for the SLB issued in July 2023 can be found here.
[44] "Bonds and Loans: Hungary, Andorra and Malaysia issue green bonds", Responsible Investor, 28 Apr 2021.
[45] "Aeroporti di Roma Issues €400 Million Bond Tied to Climate Goals", ESGtoday, 5 Jul 2023.
[46] Using data from Bloomberg, issuance 1 Jan 2023 to 24 Jul 2023, currency of EUR and size greater than $0.5bn.

Sustainability KPIs

ADRIT SLBs use three KPIs. The first is absolute Scope 1 + 2 emissions compared to a 2019 baseline. The second is its Airport Carbon Accreditation (ACA) level. The third is Scope 3 emissions intensity per passenger, however excluding aircrafts sources.

ADRIT have published two sustainability-linked financing frameworks, one for each SLB. The KPIs are identical, although the target for KPI3 was made more ambitious for the second framework. The full details are show in Table 4.[47]

We note, all KPIs apply only to Fiumicino airport, however this is estimated as more than 94% of total CO_2 emissions for ADRIT in 2019.

Table 4. ADRIT KPI details. Source: ADRIT Sustainability-Linked Financing Frameworks, accessed 24 Jul 2023.

		Sustainability-Linked Finance Framework 1				Sustainability-Linked Finance Framework 2			
		Date	Target	Date	Target	Date	Target	Date	Target
KPI1	Absolute Scope 1 + 2 emissions compared to 2019 baseline	2027	-53%	2030	-100%	2027	-53%	2030	-100%
KPI2	ACA rating (rated 4+ since 2021)	2027	4+	2030	4+	2027	4+	2030	4+
KPI3	Scope 3 emissions intensity (excluding aircraft sources) compared to 2019 baseline	2027	-7%	2030	-10%	2027	-10%	2030	-30%

KPI1 targets zero emissions by 2030. The most recent reporting showed an interim reduction of 19% in 2021 compared to 2019, but this was alongside pandemic-related air traffic reduction.

KPI2 targets ACA accreditation, aiming to maintain level 4+ (Transition), the highest level possible,[48] which was first awarded in 2021. The ACA website indicates that out of 514 accredited airports across the world, just 46 airports have achieved level 4+. There is a high degree of correlation between KPI2 and both other KPIs used by ADR, as attainment of level 4+ requires the setting and achievement of emissions reductions targets for Scope 1+2 emissions as well as Scope 3 emissions at the discretion of the airport operator. We note that this target has already been achieved, and therefore requires no improvement to achieve.

KPI3 covers the airport's Scope 3 emissions. This is a poorer measure than Heathrow's SLB primarily because aircraft sources are excluded, and because it is an intensity measure so absolute emissions can still rise if passengers increase substantially. The SPOs for both SLBs make mention of the absence of Scope 3 emissions from aviation activities and note that these emissions could account for over 80% of ADR's total emissions. [49]

Interestingly, despite not covering a significant portion of the airport's emissions, the Scope 3 target is considered 'strong' in the SPOs for both frameworks, provided by Sustainalytics. The SPTs associated with KPI3 are the only place where the two frameworks published by ADRIT differ. The earlier framework used by the first SLB set a reduction target of 7% by 2027, however this was

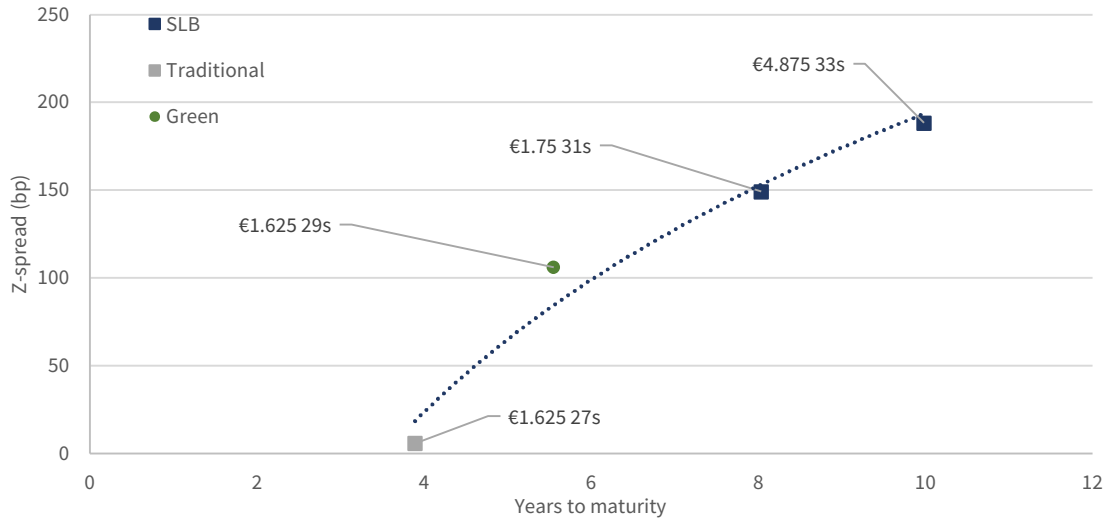
[47] For all relevant documents please see "Sustainable Finance", Aeroporti di Roma, accessed 24 Jul 2023.
[48] Information on what is required to achieve level 4+ can be found in the Airport Carbon Accreditation Application Manual.
[49] Details are in the analysis of the second sustainability-linked financing framework "Second-Party Opinion Aeroporti Di Roma 2022 Sustainability-Linked Financing Framework", Sustainalytics, 7 Apr 2022.

updated to 10% by 2027 in the more recent framework alongside a target of a 30% reduction by 2030, used by the more recent SLB issuance. It is positive to see a more ambitious target, although it would be preferable to reduce a larger scope of emissions.

Bond pricing

Figure 6 shows current pricing levels of ADRIT bonds. The curve highlights that ADRIT has transitioned to using SLB for their new financing, after one green bond that has rolled down to a six-year maturity. It is hard to make strong pricing conclusions, and all the bonds seem to be pricing consistently.

Figure 6. ADRIT bond spreads. Source: Bloomberg, accessed 19 Jul 2023.



Summary

The SLBs issued by ADRIT use less material KPIs compared to Heathrow. They don't consider air traffic, use an intensity measure for Scope 3, and have already achieved the targeted level for the airport's accreditation.

Nevertheless, it is positive to see targets being tightened for KPI1 between the deals, as SLBs are used to meet its ongoing financing needs.

Case study: Mexican airports

In earlier work, we have observed that emerging markets excluding APAC, have been a strong user of the SLB product,[50] with Chile the largest sovereign issuer.[51] As Table 2 shows, in the airport sector, the highest number of bonds come from Mexican airports, with two issuers each having issued three or more bonds.

Grupo Aeroportuario del Centro Norte

Grupo Aeroportuario del Centro Norte (ticker GACENO), known as OMA, is a Mexican airport operator managing 13 airports in the central and northern states of Mexico. They have six bonds

[50] Please see Figure 2 in "SLBs: complementary, my dear Investor", AFII, 13 Apr 2023.
[51] "Offi-Chile the largest sovereign SLB issuer", AFII, 29 Jun 2023.

outstanding, all denominated in Mexican Pesos, with total notional MXN 10.7bn. In Apr 2021 they issued one vanilla and one green bond, and in Mar 2022 and Mar 2023 they issued two SLBs each. Five of their bonds, or 77% of notional, are ESG-labelled.

OMA's sustainability-linked financing frameworks reference one KPI, Scope 1 + 2 emissions intensity per passenger. This selection is classified as 'aligned' by its SPO provider, which is the third of four ratings on the scale.[52] It is acknowledged that the materiality of this KPI is limited given Scope 3 emissions, "which account for the bulk of the group's emissions", are not included. We would argue further, that having an intensity measure against the background of projected growth in air travel, limits the overall impact of achieving a reduction. The target, a 58% reduction compared to a baseline in 2018, is also classified as 'aligned', and it is noted that this is not benchmarked to peer performance.

Figure 7. GACENO bond spreads. Source: Bloomberg, accessed 19 Jul 2023.

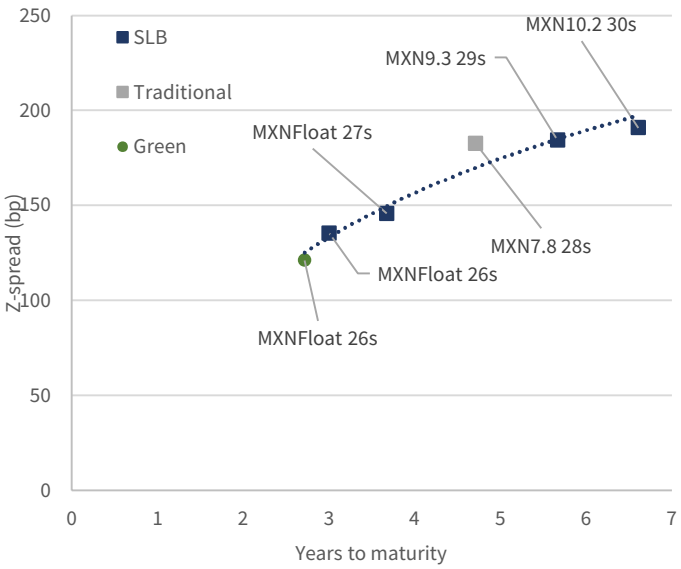


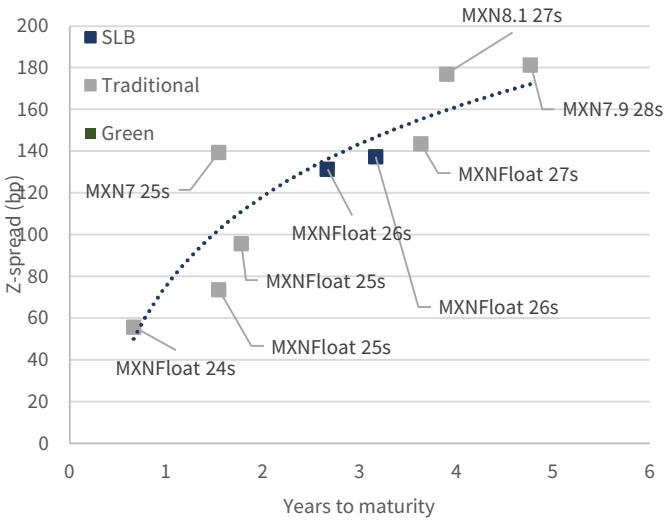
Figure 7 shows pricing on the bonds. Given there is only one traditional issuance, it is hard to compare between the structures. We observe the traditional issuance seems to be the widest bond, indeed the SLB MXN 9.3 29s seems to be flat to traditional MXN 7.8 28s despite its longer maturity and higher coupon, and this could suggest the SLBs are being priced at a tighter spread to account for a positive option value.

Grupo Aeroportuario del Pacifico

Grupo Aeroportuario del Pacifico (ticker GAPBMM), known as GAP, is a Mexican airport operator managing 12 airports in the western states of Mexico and two in Jamaica. It has 12 bonds outstanding, all denominated in Mexican Pesos, with total notional MXN 31.26bn. Its sustainable debt journey began in Oct 2021 with one green bond, following by one SLB in Sep 2022 and two in Mar 2023, which totals 31% of their debt as being ESG-labelled.

GAP's sustainability-linked financing framework also references only one KPI, which is absolute Scope 1 + 2 emissions. This is classified as 'adequate' by the SPO

Figure 8. GAPBMM bond spreads. Source: Bloomberg (note not all bonds had available pricing), accessed 19 Jul 2023.



[52] "Grupo Aeroportuario del Centro Norte's Sustainability-Linked Financing Framework SPO", S&P Global Ratings, 7 Mar 2022.

provider, the third of a four point scale.[53] It is noted that there is an absence of Scope 3 emissions data. Full materiality of their exclusion from the KPI cannot be ascertained, and so this KPI is considered to have a 'limited scope of applicability'. The target however, a 25% reduction from a 2019 baseline, is considered 'highly ambitious', which is the strongest rating, and reported to be aligned with SBTi's 1.5°C scenario. We observe though that 2021 data is already below the target, driven by falling passenger numbers due to the pandemic, but emissions are projected to rise again driven by recovery of air travel numbers.

Figure 8 shows pricing on GPBMM bonds where available also shows that the SLBs potentially have tighter pricing when compared to some traditional bonds. This suggests SLBs as a product are well received in the MXN market.

Summary

Mexican airports have been a user of SLBs with two issuers each having issued more than three bonds in the last two years. Unfortunately, the KPIs chosen do not include Scope 3 emissions, and so have limited scope in the context of reducing emissions from air travel. Nevertheless, it is promising to see this product used in local currency markets, alongside a commitment for increased data transparency, and pricing suggesting they have been well received by investors.

Conclusions

Air traffic is a large source of emissions, and one whose volume is projected to grow significantly. Current reduction strategies, focused on fuel efficiencies and Sustainable Aviation Fuel, will struggle alone to reduce emissions to achieve net zero. Investment is needed for a true transition.

Green bonds have been used in the airport sector. However, there has been much greenwashing criticism around whether investments made are really material to the broader environmental concerns of airports.

SLB growth has been significant in the past year. This shows a promising commitment to sustainability, as these bonds can raise capital to invest in new technologies and promote accountability of sustainability targets.

The recent Heathrow bond in particular was an ambitious structure covering all emissions. Pricing suggests the bond demand was weak, and that even more ambitious targets are needed to get investors past challenges in the sector. Investors need to show that a tighter cost-of-capital could be available to ambitious structures, in order to incentivise issuers to make those commitments.

[53] "Grupo Aeroportuario del Pacifico's Sustainability-Linked Financing Framework SPO", Sustainalytics, 23 Aug 2022.

Appendix: Sustainability-Linked Loans

We note that the airport industry has also been a user of Sustainability-Linked Loans (SLL), which are private debt products where funding rates are linked to sustainability performance.

Comprehensive data is harder to obtain, due to the deals being private, but

Table 5 shows details on the transactions that we have been able to identify.

Even though several of the deals are very small, and SLL have been subjected to additional greenwashing criticisms over and above the SLB market,[54] this does represent an additional spoke to the growing theme of sustainable financing for airports. None of the deals seem to include Scope 3 emissions (the Aena one refers only to 'emissions'), but it is hopeful that improved ambition in the SLB market will drive improved ambition in the SLL market.

Table 5. Sustainability-Linked Loan issuance in the airport sector, where information is available. Source: varied, linked by line.

Issuer	Reported Date	Maturity Date	Issue Amount (bn)	Currency	Structure	Comment on KPI
Adelaide Airport[55]	Dec-18	Dec-25	0.05	AUD	RCF	ESG rating
Sydney[56]	Jun-19	Jun-22	0.57	AUD	syndicated-SLL	ESG rating
Sydney	Jun-19	Jun-23	0.53	AUD	syndicated-SLL	ESG rating
Sydney	Jun-19	Jun-24	0.30	AUD	syndicated-SLL	ESG rating
Edinburgh Airport[57]	Jun-21	Mar-24	0.10	GBP	syndicated-SLL	Direct emissions, renewable energy
Hawkes Bay[58]	Nov-21		0.02	NZD	SLL	Operational emissions
Budapest Airport[59]	Dec-21	Jun-24	0.33	EUR	Derivative	Renewable energy
Christchurch[60]	Dec-21				SLL	Carbon reduction, renewable energy, energy efficiency
North Queensland Airports[61]	Sep-22				SLL	Direct emissions, renewable energy, biodiversity, social
Wellington[62]	Apr-23		0.10	NZD	SLL	Direct emissions, waste
Aena[63]	Jul-23	Jul-28	2.00	EUR	RCF	Emissions

[54] "FCA warns banks over 'greenwashing' in sustainable loans", FT, 29 Jun 2023.
[55] "Adelaide Airport secures Australia's first Sustainability loan with ANZ", Adelaide Airport, 20 Dec 2018.
[56] "Sydney Airport successfully delivers innovative Sustainability Linked Loan", Sydney Airport, 23 May 2019.
[57] "ACT Deals of the Year Awards 2021: Loans below £750M winner", ACT, 31 Mar 2022.
[58] "ASB and Hawke's Bay Airport partner on multi-million dollar sustainability-linked loan", Hawke's Bay, accessed 17 Jul 2023.
[59] "Budapest Airport signs EUR 325 mln green financing deal", Budapest Business Journal, 20 Dec 2021.
[60] "Christchurch Airport Establishes Its First Sustainability Linked Loan (SLL) Facility", Christchurch Airport, 21 Dec 2021.
[61] "Australian first sustainability linked-loan helps North Queensland environment", NAB News, 6 Sep 2022.
[62] "Wellington Airport announces $100 million in sustainability-linked lending", Wellington Airport, 3 Apr 2023.
[63] "Aena signs a €2 billion sustainability-linked revolving credit facility", International Airport Review, 3 Jul 2023.

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