# Thai government embarks on SLB journey

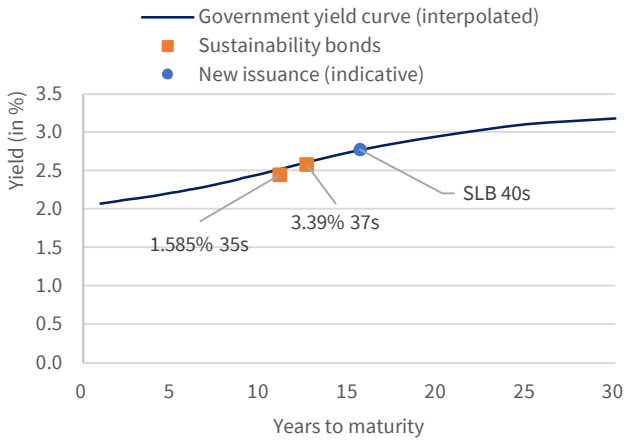
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The Thai government (ticker: THAIGB) plans to issue its first Sustainability-Linked Bond (SLB) on 25 Nov 2024, having issued sustainability bonds in 2020 and 2022.[1]

The proposed SLB (ISIN: TH0623B3K608) has a term of around 15.5 years, maturing on 17 Jun 2040. The bookbuilding process is scheduled to begin on 19 Nov, with the subscription period lasting from 21 Nov to 22 Nov. This is when fixed income investors will have the chance to engage with the issuer on the structure.

The initial issuance size is expected to be THB 20-30 bn (approximately USD 575-860 mn), though this could rise to THB 130 bn (equivalent to USD 3.7 bn) over the course of this fiscal year.

*Figure 1. Thai government bond yield curve. Source: Bloomberg, AFII, accessed 13 Nov 2024.*




In this note, we evaluate the transaction for investors, and value the option embedded in the SLB structure. We offer the following takeaways:

- The bond represents the first government SLB issuance in the ASEAN region. As such, it is a welcome show of support for the SLB structure as a means to pursue national sustainability ambitions. The targets are well defined and seem (moderately) ambitious.
- The coupon adjustment structure comprises a symmetric step-up/down mechanism linked to two sustainability performance targets (SPTs). In the context of option pricing and financial materiality, we think a more meaningful coupon adjustment than the 2.5bps chosen would have enhanced the structure. Because of the small size of the step-up/down, we see very limited potential for optionality being priced at issuance based on our option pricing approach. Therefore, we think it is likely the bond will price broadly in line with the yield curve, as illustrated in Figure 1.
- The issuance in local currency supports domestic capital market development, which is important for emerging economies. The previous issuance of sustainability bonds indicates a sufficiently deep capital market and domestic demand for such instruments. On the other hand, the denomination in Baht makes it more difficult for some international investors to access this SLB.

[1] Sustainability bonds restrict the use of proceeds to eligible investments, whereas an SLB has flexibility over its usage but usually has a coupon adjustment if a sustainability objective is not met.

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# Introduction

The Thai government has two sustainability bonds outstanding, maturing in 2035 (TH062303FC01) and 2037 (TH0623A3H605). Since their initial issuance they have grown to THB 482 bn combined[2] and are now among the largest sustainability bonds globally. These Use of Proceeds (UoP) bonds have supported a range of eligible green and social projects (e.g. COVID-19 financing and refinancing of expenditures related to Mass Rail Transit).[3]

While UoP bonds are well established in debt markets, Thailand is only the third country where the government issues SLBs. The first was Chile, which issued the first sovereign SLB in early 2022 and has since issued several more, both in the international and local currency markets. At one time it was the second-largest issuer of SLBs in the world.[4] Uruguay was the second,[5] having issued an international bond with an innovative step-up/down structure in 2022.

The Thai market is not wholly unfamiliar with SLBs, however. A range of Thai companies have issued these instruments locally, including BTS Group Holdings (BTSTB),[6] Thai Union Group (TUTB),[7] and Indorama Ventures (IVLTB).[8]

# Bond structure and SPT assessment

The Thai bond is linked to two SPTs measured against two Key Performance Indicators (KPIs), as summarised in Table 1. SPT1 concerns total Greenhouse Gas (GHG) emissions excluding Land Use, Land-Use Change and Forestry (LULUCF) and SPT2 the number of new zero-emission vehicle (ZEV) passenger cars and pick-up trucks newly registered per year. For each target the government achieves, the bond's coupon will adjust down 2.5bps. For each miss, it will adjust up 2.5bps.

Notably, there is a considerable time lag between the observation date (2030), reporting (2035 for KPI1 and 2031 for KPI2) and coupon adjustments. Based on available information,[9] the earliest the coupon could be adjusted is for payments from 17 Jun 2036 for SPT1 and 17 Jun 2032 for SPT2.

*Table 1. Key parameters of the Thai SLB. Source: Ministry of Finance, AFII.*

| KPIs | SPTs | Coupon adjustments |
|---|---|---|
| Total GHG emissions excluding Land Use, Land-Use Change and Forestry (LULUCF) | SPT 1: Not exceeding 388,500 ktCO2e in 2030 | Achieve: decrease by 2.5 bps<br>Miss: increase by 2.5 bps<br>Commencing from 17 June 2036 |
| Newly registered ZEV passenger cars and pick-up Trucks per year | SPT 2: No less than 440,000 vehicles in 2030 | Achieve: decrease by 2.5 bps<br>Miss: increase by 2.5 bp<br>Commencing from 17June 2032 |

[2] "Bond Information: ESGLB35DA", The Thai Bond Market Association, "Bond Information: ESGLB376A", The Thai Bond Market Association, accessed 12 Nov 2024.
[3] "Kingdom of Thailand: Sustainability Bond Issuance, Investor Presentation", Kingdom of Thailand, Jul 2020.
[4] For analysis on the Chile Sovereign issuances please see "Offi-Chile the largest sovereign SLB issuer", AFII, 29 Jun 2023 and "Chile's Peso SLB issuance", AFII, 27 Jul 2022.
[5] "Uruguay SLB: market update", AFII, 5 Jun 2023.
[6] This used an alternative step structure as discussed in "Sustainability-Linked Bonds: alternative steps", AFII, 23 May 2023.
[7] "Thai Union meets its first SLB target: like shooting fish in a barrel", AFII, 11 Jun 2024.
[8] As covered in "Chemicals sector: synthesising impact with SLBs", AFII, 13 Jul 2023.
[9] "Preliminary Information Memorandum", The Kingdom of Thailand, 13 Nov 2024.

Given that the transport sector accounted for 21% of Thai GHG emissions in 2019,[10] there is a certain degree of dependency between the two targets – achieving SPT2 would make achieving SPT1 more likely, all else equal.

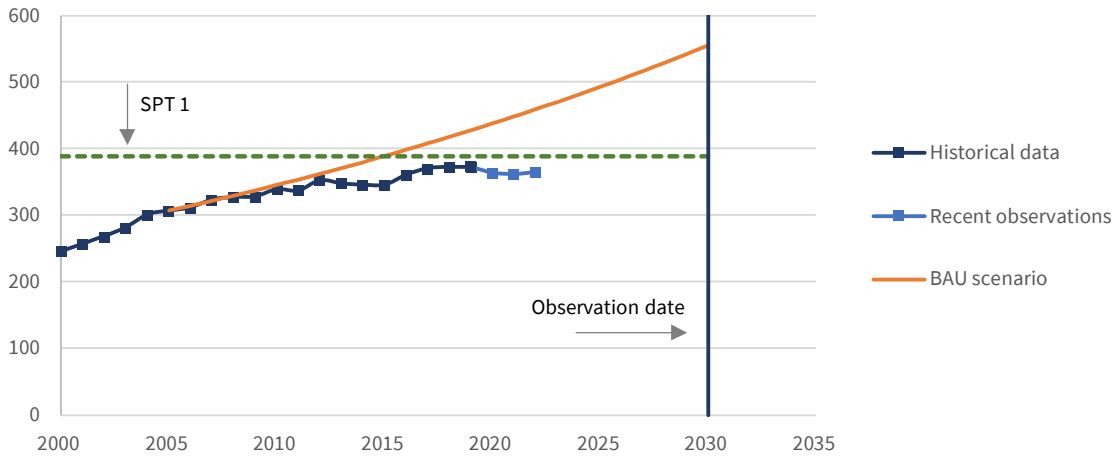
## SPT 1

The GHG emissions target, excluding LULUCF, is 388,500 ktCO2e by end-2030. This equates to a 30% reduction relative to a Business-as-Usual (BAU) projection from a 2005 baseline, as shown in Figure 2.[11] Note that the most recent data indicates Thailand has already achieved this target. However, as explained below, it should still be considered moderately ambitious.

The target is aligned with Thailand's Nationally Determined Contribution (NDC), and the related tracking mechanism is not dependent on the debt issuance itself.

While this results in a robust process for computing and delivering data, the current biennial reporting cycle means information on Thailand's emissions performance is delayed by up to four years. Therefore, an observation for SPT1 may not be possible until 2034,[10] nor an associated coupon payment until 17 Jun 2036. This time lag reduces significantly the financial materiality of the coupon adjustment, as it would only apply for a short portion of the bond's term.

*Figure 2: GHG Emissions, excluding LULUCF (MtCO2e). Source: PDMO, PIK, AFII.*




Nevertheless, this SPT is potentially priceable, given GHG emissions data can be used to calculate the historical dynamics of the KPI over different time periods.

We find the data for this analysis from Thailand's Sustainability-Linked Financing Framework, which provides historical emissions data from 2000 to 2019 sourced from the country's most recent biennial report. We also use additional data points from the Potsdam Institute for Climate Research (PIK).[12]

[10] "Kingdom of Thailand Sustainability-Linked Financing Framework", Kingdom of Thailand, Oct 2024.
[11] Based on an average annual increase in emissions of approximately 2.4% from the reference year 2005, assuming no major climate policy.
[12] Filtered PIK data was accessed through Climate Watch Data Explorer. Original unfiltered date can be found here: PRIMAP-hist national historical emissions time series (1750-2023) v2.6

In order to calculate the probability of SPT1 being achieved, we look at the historical annual drift and volatility of the country's emissions. As shown in Table 2, data from 2005-2022 gives an average annual drift of 1.09% and volatility of 1.97%. However, this finding is influenced by relatively large emissions increases in the first half of the sample. Looking at the data for the last decade, there is a significantly lower drift (0.37%). We think this more recent data offers a firmer foundation on which to base an estimate as to whether the 2030 target will be achieved.

Following our analysis of GHG emissions for previous sovereign issuances,[13] we use a Black-Scholes approach to estimate the probability of achieving the target based on the drift and volatility values. We assign a 50-75% probability of achieving SPT1.

The estimate is sensitive to sample selection and a longer time series would result in a probability below 50%, given historical rises in emissions. In our view, the target is moderately ambitious but seems achievable due to the recent trajectory changes.

*Table 2. Annual drift and volatility of Thai GHG emissions. Source: AFII.*

| | **Annual drift** (average) | **Annual volatility** |
|---|---|---|
| 2005-2022 | 1.09% | 1.97% |
| 2013-2022 | 0.37% | 1.85% |

One concern investors have with SLB structures that reference GHG emissions is the ambitiousness of targets. According to the International Capital Markets Association (ICMA), in order for an SPT to be considered ambitious, it should represent a material improvement in the relevant KPIs and surpass a "business as usual" trajectory.

Thailand balances reducing emissions relative to a BAU scenario with continued economic development. As is common in emerging economies, Thailand is reliant on industrial production for economic growth. Continued economic progress together with emissions reductions therefore requires further investments in clean technology and infrastructure.[14] In this paradigm, despite SPT1 having a GHG emissions target that is actually above the latest emissions data, the second party opinion views SPT1 as ambitious, given Thailand's status as an emerging market that is reliant on industrial production.

### SPT 2

To achieve this target, Thailand has to reach 440,000 annual registrations of ZEV passenger cars and pick-up trucks by 2030,[15] compared to a baseline of 76,361 in 2023.

Policymakers have announced several measures to support the ZEV transition, including subsidies and tax reductions. As part of the 30@30 policy, ZEVs should account for 50% of newly registered passenger cars and pick-up trucks by 2030. Moreover, by that same year 30% of vehicles produced in Thailand should be ZEVs. The policy suggests the electric vehicle (EV) industry could produce 225,000 cars and pick-up trucks by 2025 and over 700,000 by 2030.[10] Recent news reports indicate

[13] For example "Chile sustainability-linked bond: Optionality analysis", AFII, 5 Apr 2022.
[14] "Second Party Opinion on Kingdom of Thailand's Sustainability-Linked Financing Framework", DNV (Thailand) Co., Ltd., 31 Oct 2024.
[15] As defined in the Sustainability-Linked Financing Framework, this refers to newly registered vehicles and includes fully electric and battery electric vehicles (BEVs) and excludes both plug-in hybrid electric vehicles (PHEVs) and hybrid electric vehicles (HEVs).

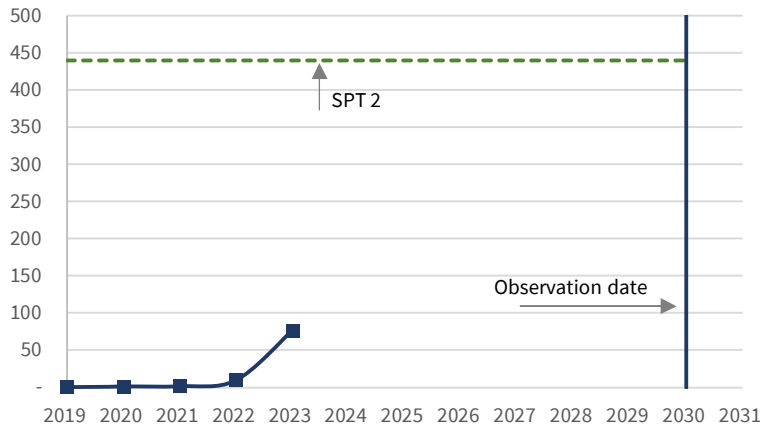
that manufacturers are increasing capacity,[16] suggesting that Thailand has an opportunity to meet SPT2 through domestic production alone.

However, capacity does not equal production and there might be delays that frustrate production targets (e.g. construction, supply chains). The interim target (225,000 by 2025, 30% of total new registrations) stated in the Sustainability-Linked Financing Framework marks an opportunity to assess progress.

Looking at recent trends, following a sharp increase in 2023 (see Figure 3), growth is already slowing down. Data up to October 2024 shows the share of relevant new ZEV registrations was 10.5% this year, compared to 9% in 2023 and 1.1% in 2022.

In our view, there are signs that meaningful progress towards SPT2 will be made due to a range of policies, subsidies, and tax reductions. News about increasing production capacity is also encouraging. But ultimately domestic demand will be critical. At this stage, we assign an illustrative 50% probability to achieving SPT2. Regularly published data will allow investors to monitor progress on this target with a short time lag.

*Figure 3: Annual registrations of relevant ZEVs (in Thousands) for Thailand. Source: PDMO.*




## Option Pricing

Building on our extensive work on SLB pricing,[17] we use an option pricing approach to assess the bond structure.

Conceptually, this allows us to quantify the optionality of a coupon step-up or step-down. This bond is particularly interesting because of its symmetric step structure (a 2.5bps step-up/down for each target) and its multiple coupon adjustment dates. The adjustment for SPT2 will take place for payments from June 2032 and that for SPT1 from June 2036.

Accordingly, the combined coupon adjustments from mid-2036 to maturity will be either -/+5bps (both SPTs achieved/missed) or 0bps (one SPT achieved, the other one missed). Note that

[16] Based on an article by S&P Global Mobility "BriefCASE: EV manufacturing in Thailand gets booster shots from Chinese automakers", we calculate a potential capacity of around 600,000 ZEV cars by 2025 (see appendix for details). However, it's unclear how much of the production is meant for exports.
[17] For more details on Sustainability-Linked Bond option pricing please see "Sustainability Linked Bond Handbook", AFII, 12 May 2024.

probability of step-up and step-down for each target are interdependent. For each SPT, a X% probability of achieving the target (step-down) implies a 1-X% probability of missing the target (step-up).

This being the case, a 50%/50% probability of achieving/missing the target would result in an option value of zero for that SPT as the probability-weighted coupon adjustments net out. As we assign a 50% probability of achieving SPT2, we conclude there is no option value here.

Given historical data suggests that there could be a 50-75% probability of achieving SPT1, our analysis concludes a step-down is more likely. We therefore assign it a negative option value. Given the small coupon adjustment and the fact that it would only apply to the last four years of the 15.5-year term of the bond, the running value of the option is close to zero.

## Conclusions

It is encouraging to see the first government in the ASEAN region issue an SLB. This demonstrates confidence by the Thai authorities in the structure as a means to support its sustainability ambitions. The issuance might encourage Thailand and other ASEAN countries to use SLBs more often.

The bond's SPTs are well defined and seem (moderately) ambitious. The symmetric structure of coupon adjustments is unique, setting clear incentives as it allows for step-ups and step-downs alike. Looking at the SLB in terms of option pricing and financial materiality, however, we think a more meaningful coupon adjustment would have enhanced the structure.

Based on our analysis, we see very limited potential for optionality being priced at issuance. Accordingly, we think it is likely the bond will price broadly in line with the government yield curve.

One other feature of the bond is noteworthy – the issuance in local currency. This supports domestic capital market development, which is important for emerging economies. Thailand's earlier success in launching two sustainability bonds indicates a sufficiently deep capital market and domestic demand for such instruments. On the flipside, the Thai Baht denomination makes it more difficult for some international institutions to access this SLB, potentially limiting the pool of potential investors.

# Appendix

*Table 3. EV Manufacturers with car production in Thailand, in recent news that AFII is aware of. Sources: Listed in Table.*

| Manufacturer | Capacity | Data Source |
|---|---|---|
| BMW | 12,000 | BMW Group launches construction of high-voltage battery assembly plant in Thailand |
| BYD | 150,000 | BYD Thailand Factory Inauguration and Roll-off of Its 8 Millionth New Energy Vehicle |
| Changan Automobile | 200,000 | CHANGAN breaks ground for a brand new CHANGAN Thailand Manufacturing Base at WHA Eastern Seaboard Industrial Estate 4 |
| GAC Aion | 50,000 | BriefCASE: EV manufacturing in Thailand gets booster shots from Chinese automakers |
| Great Wall Motor | 80,000 | GWM Signs Definitive Agreement with GM to Purchase Manufacturing Facility in Rayong |
| Hyundai | 5,000 | Hyundai invest 1 Billion Baht in Thailand's EV Industry and Unveils the High-Performance IONIQ 5 N |
| Neta Auto | 20,000 | NETA Announces EV Production Readiness in Thailand, with Production of NETA V-II Scheduled in the First Quarter of 2024 |
| SAIC | 100,000 | SAIC Motor establishes new plant in Thailand |

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