KINGDOM OF THAILAND'S SUSTAINABILITY-LINKED BOND PROGRESS REPORT

JUNE 2025

สำนักงานบริหารหนี้สาธารณะ
PUBLIC DEBT MANAGEMENT OFFICE

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Kingdom of Thailand (KOT) SLB Issuance and SLB Framework

Drawing inspiration from global pioneers, Thailand has embraced innovative financial instruments to advance its sustainability agenda. Steps towards sustainable finance began in July 2020 with Thailand Public Debt Management Office (PDMO) issuing the first Sustainable Financing Framework. Providing a guide on issuance of financial instruments aimed at funding projects with positive environmental and social impacts. This led to raising funds to support both green infrastructure projects (e.g., the Mass Rapid Transit: MRT Orange Line in Bangkok) and social initiatives (e.g., COVID-19 relief efforts), resulting in the first of its kind in ASEAN sustainability bond.

Building upon the success of the initial sustainability bond, PDMO further advanced its sustainable finance initiatives by issuing its first Sustainability-Linked Bonds (SLB) in November 2024, under the new KOT Sustainability-Linked Financing Framework designed to integrate national sustainability targets into sovereign debt instruments. The inaugural 15-year benchmark bond, initially targeted at THB 20 billion, saw an overwhelming demand, attracting total bids exceeding THB 55 billion. As a result, the issuance was increased to THB 30 billion (approximately USD 865 million), highlighting investor confidence in Thailand's climate commitments and economic resilience.

This landmark transaction positioned Thailand as the first country in Asia to issue a sovereign SLB and third globally, following Chile and Uruguay. Indicating Thailand's commitment to environmental, social and governance principles and alignment of its financial mechanisms with measurable sustainability outcomes.

Context

In October 2024, PDMO announced the development of its Sustainability-Linked Financing Framework (the "Framework"), (PDMO, 2024). This reflects Thailand's commitment to achieving carbon neutrality by 2050 and net-zero greenhouse gas (GHG) emissions by 2065, as outlined in the Thailand's Long-term Low Greenhouse Gas Emissions Development Strategies (LT-LEDS). To ensure credibility and appropriateness, the framework aligns to international principles including:

- The International Capital Market Association (ICMA) Sustainability-Linked Bond Principles (SLBP) 2024;
- The Loan Market Association (LMA), Loan Syndications and Trading Association (LSTA) and Asia-Pacific Loan Market Association (APLMA) Sustainability-Linked Loan Principles (SLLP) 2023; and
- The ASEAN Capital Markets Forum (ACMF) ASEAN Sustainability-Linked Bond Standards (ASEAN SLBS) 2022 (together, the "Principles").

KOT has appointed DNV (Thailand) Co., Ltd to provide a Second Party Opinion, (DNV, 2024), which has confirmed the Framework's alignment with the Principles.

As the SLB is a unique financial instrument that directly ties issuer's achievement to predefined Sustainability Performance Targets (SPTs), **Table 1** details the selected Key Performance Indicators (KPIs) and SPTs for the KOT.

Table 1: SPT for each KPI as stated in the SLB Framework

Key Performance Indicators (KPIs)	**KPI 1:** Total Greenhouse Gas Emissions (excluding removals from Land Use, Land Use Change and Forestry: LULUCF[1]) ($ktCO_2e$)	**KPI 2:** Annual registrations of Zero Emission Vehicle (ZEV) passenger cars and pick-up trucks
Sustainability Performance Targets (SPTs)	**SPT 1:** Achieve Total GHG Emissions (excluding removals from LULUCF) of 388,500 $ktCO_2e$ by 2030, which would represent a 30% reduction from the Business-as-usual (BAU) scenario	**SPT 2:** Increase annual registrations of ZEV passenger cars and pick-up trucks by 476% by 2030, equivalent to 440,000 passenger cars and pick-up trucks
Rationale	GHG Emissions represents Thailand's commitment to addressing the impacts of climate change. SPT 1 is in line with the NDC target of 30% reduction from the BAU scenario by 2030.	Transport sector contributed 21% of Thailand's overall GHG emissions in 2019. EVs also play a crucial role in reducing pollution, particularly the particulate matter (PM2.5).

Summary of KOT's SLB Issuance

Table 2: Summary of KOT's SLB Issuance

Summary of Bond Series (ThaiBMA Symbol)	Issuance / Tap Date	Maturity Date	Coupon	Amount Issued/ Outstanding
SLB406A	25 Nov 2024	17 Jun 2040	2.70%	THB 30 billion
SLB406A (Tap Issuance)	20 Feb 2025	17 Jun 2040	2.70%	THB 29 billion
SLB406A (Tap Issuance)	11 Apr 2025	17 Jun 2040	2.70%	THB 15 billion
SLB406A (Bond Switching)	21 May 2025	17 Jun 2040	2.70%	THB 9 billion
SLB406A (Tap Issuance)	6 Jun 2025	17 Jun 2040	2.70%	THB 15 billion
Total Amount Outstanding				**THB 98 billion**

Furthermore, KOT plans to further tap the SLB issuance for around THB 130 billion issuance in the fiscal year 2025.

[1] LULUCF: Refers to land use, land-use change and forestry, which in Thailand's case acts as a carbon sink offsetting some emissions (not counted towards KPI 1).

Key Characteristics of KOT's SLB

The financial characteristics of the KOT's SLB are specifically designed to embed the sustainability commitments into the sovereign debt structure, ensuring that the progress towards predefined targets is financially incentivized. Thus, in the event that KOT fails to achieve the committed SPT, a financial adjustment (i.e., increase in coupon payment or step-up) may be imposed.

For KOT's SLB launched in November 2024 ("SLB406A"), each SPT is subjected to an adjustment of 2.5 basis points (bps). Key financial characteristics of SLB406A are provided in **Table 3.**

Table 3: Financial characteristics of SLB406A

Issuer	The Kingdom of Thailand, acting through the Ministry of Finance of Thailand	
Amount Outstanding	THB 98 billion	
Tenor at Initial Issuance	15 years 6 Months 23 Days	
Initial Issue Date	25 November 2024	
Maturity Date	17 June 2040	
Interest Rate	2.70%	
Target Observation Date	31 December 2030	31 December 2030
SPTs Adjusted Rate Effective Date	17 December 2035	17 December 2031
Possible Interest Rate Adjustment (in case of failure or meet SPT)	**Coupon Step-Up:** If SPT 1 is not met: 2.5 bps Step-Up, If SPT 2 is not met: 2.5 bps Step-Up	**Coupon Step-Down:** if SPT 1 is met: 2.5 bps Step-Down, if SPT 2 is met: 2.5 bps Step-Down
Interest Payment Date	Fixed rate, semi-annually (payable on 17 June and 17 December of every year throughout the terms of the Bond)	

Reporting Requirements

To ensure the transparency and credibility of data, KOT is required to disclose progress on an annual basis. Progress data are required to be readily and easily accessible on the PDMO's website or at least until after the last SPT trigger event. As outlined in the framework, an SLB Progress Report will be published no later than June 30 of each year for data as of December 31 of the preceding year.

By publishing this report, KOT complies with the reporting commitment for disclosing:

- Information regarding KPI 1 (i.e., KOT's GHG inventory), in accordance with the current Nationally Determined Contribution (NDC) protocol. Data verification will be conducted as part of the NDC process and disclosed on the United Nations Framework Convention on Climate Change (UNFCCC) website.
- Information regarding KPI 2, informing the progress of ZEV passenger cars and pick-up trucks under the Motor Vehicle Act, in accordance with the registered data disclosed by the Department of Land Transport (DLT). Verification shall be completed by an independent external reviewer.

This report has been prepared in line with the reporting requirements under ICMA SLBP and ASEAN SLBS.

Progress of KPIs

KPI 1: Total Greenhouse Gas Emissions (excluding removals from LULUCF)

Thailand's national GHG emissions (excluding removals from LULUCF), based on the first Biennial Transparency Report (BTR1), totaled 385,941.14 $ktCO_2e$ in 2022. This is below the SPT 1 target of 388,500 $ktCO_2e$ for 2030, indicating positive progress toward the goal. While GHG emissions increased 5% from 2021 to 2022 due to economic recovery post-pandemic, Thailand is actively implementing strategies, including the upcoming Climate Change Act, Thailand Taxonomy, and carbon pricing instruments, to ensure continued emission reductions in line with its NDC targets.

On 21 January 2025, the Thai Cabinet approved the draft Ministerial Regulation establishing the carbon tax of 200 Thai Baht (THB) per metric ton of carbon dioxide (CO_2) equivalent (tCO_2e). At this initial stage, the carbon tax is integrated into the existing excise tax structure on oil and petroleum products, ensuring no additional financial burden on consumers or the industrial sector. The purpose of this is to raise awareness for consumers and prepare for stricter carbon pricing in the future.

Thailand’s national GHG inventory was established to meet international obligations under the UNFCCC. Specifically, according to Article 4 and 12 of the UNFCCC and Article 13 of the Paris Agreement, which mandates the development and reporting of national inventories of GHG emissions and removals. To fulfill this commitment, Thailand adhered to the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories. The Department of Climate Change and Environment (DCCE), under the Ministry of Natural Resource and Environment, oversees the development of Thailand Greenhouse Gas Emissions Inventory System (TGEIS). TGEIS is a comprehensive platform designed to support the compilation and management of GHG data across various sectors and serves as a tool for generating reports compliant with UNFCCC requirements.

As a Non-Annex I Party to the UNFCCC, Thailand is required submit Biennial Update Reports (BURs) every two years, in line with decision 2/CP.17. The BURs were submitted on 29 December 2015, 29 December 2017, 25 December 2020, and 29 December 2022. After ratifying the Paris Agreement on 22 April 2016, Thailand is also required to submit national GHG inventories under the Modalities, Procedures and Guidelines (MPGs) for the Transparency Framework for Action and Support referred to in Article 13 of the Paris Agreement. In this regard, the BUR serving under the UNFCCC will be replaced by the Biennial Transparency Report (BTR), which will serve as the transparency report under the Enhanced Transparency Framework (ETF). Thailand submitted the first BTR (BTR1) on its climate change response to the UNFCCC on 26 December 2024.

KPI 1 and SPT 1 requires that Thailand achieves total GHG emissions (excluding removals from LULUCF) of 388,500 $ktCO_2e$ in 2030, which represents a 30% reduction from BAU 2030 in alignment with the unconditional NDC target.

Based on the analysis of the national GHG emissions trends, as illustrated in **Figure 1** and **Table 4**, notable fluctuations were observed particularly during the COVID-19 pandemic. It is understood that stringent containment measures led to significant reduction in energy consumption, industrial production and overall economic activities, resulting in a temporary decline in GHG emissions. Nonetheless, as restrictions were relaxed and economic activities resumed, GHG emissions illustrated a 5% increase from 2021 to 2022. This rebound is attributed to the resurgence of energy demand, particularly in the services and tourism sectors. This trend aligns with global observations, where emissions decreased during the pandemic and subsequently rose as economies reopened.

Figure 1: Trend of national GHG emissions by sector for 2000 - 2022

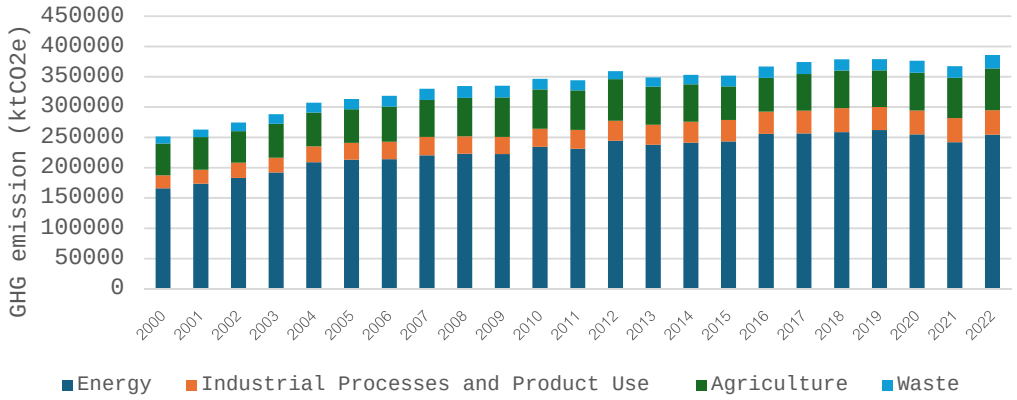


Figure source: Adjusted from Thailand's First Biennial Transparency Report (BTR1) (Thailand, 2024)

Table 4: Trend of national GHG inventory by sector for 2000-2022 ($ktCO_2e$)

Year	Source Category within Scope of KPI				Total GHG Emissions (excluding LULUCF)	Excluded from Scope of KPI	Net Emissions (including LULUCF)
	Energy	Industrial Processes and Product Use	Agriculture	Waste		LULUCF	
2000	165,993.49	21,270.17	52,572.93	11,584.23	251,420.82	-45,321.86	206,098.96
2001	173,786.87	22,851.86	53,757.54	12,495.26	262,891.53	-54,351.30	208,540.23
2002	183,231.35	24,914.92	52,186.51	14,210.25	274,543.02	-44,027.61	230,515.41
2003	192,201.46	24,139.99	55,978.17	15,853.86	288,173.48	-45,802.95	242,370.53
2004	209,166.96	25,882.04	55,725.52	16,486.35	307,260.86	-54,094.53	253,166.33
2005	213,347.12	27,753.14	55,412.52	16,847.51	313,360.29	-58,311.85	255,048.43
2006	214,099.94	28,638.69	57,874.22	17,981.81	318,594.66	-61,329.22	257,265.44
2007	220,511.18	30,280.50	61,155.73	18,404.05	330,351.45	-68,334.05	262,017.40
2008	222,914.54	28,741.86	63,403.46	19,614.30	334,674.15	-69,123.15	265,551.01
2009	222,506.38	28,161.54	65,243.35	19,393.56	335,304.82	-71,135.31	264,169.51
2010	234,426.01	29,785.43	64,836.71	17,516.55	346,564.69	-65,765.77	280,798.92

Year	Source Category within Scope of KPI				Total GHG Emissions (excluding LULUCF)	Excluded from Scope of KPI	Net Emissions (including LULUCF)
	Energy	Industrial Processes and Product Use	Agriculture	Waste		LULUCF	
2011	231,177.29	31,084.66	65,291.30	16,521.13	344,074.38	-74,574.83	269,499.55
2012	244,331.59	33,222.21	68,562.67	13,117.17	359,233.63	-80,634.49	278,599.14
2013	237,795.61	33,025.81	62,898.82	15,473.29	349,193.53	-83,060.24	266,133.29
2014	241,257.40	34,537.47	61,731.03	15,754.73	353,280.63	-100,507.61	252,773.02
2015	243,336.90	35,332.02	55,637.00	17,719.75	352,025.67	-87,328.01	264,697.66
2016	255,922.33	36,772.29	55,414.17	18,580.41	366,689.20	-87,040.09	279,649.11
2017	256,586.42	37,628.02	60,345.03	19,582.99	374,142.46	-85,379.74	288,762.72
2018	258,643.32	39,623.31	62,186.58	18,507.80	378,961.00	-85,967.13	292,993.88
2019	262,082.80	37,961.73	60,486.17	18,696.48	379,227.18	-91,986.27	287,240.91
2020	254,827.70	39,609.01	62,065.69	19,799.28	376,301.68	-95,590.26	280,711.42
2021	241,921.78	39,772.72	66,503.31	19,470.95	367,668.76	-98,028.87	269,639.89
2022	254,307.21	40,527.22	68,933.74	22,172.97	385,941.14	-107,901.43	278,039.71

Source: Thailand's First Biennial Transparency Report

Tracking progress on the total GHG emissions compared to SPT 1 level (as shown in **Table 5**) (i.e., 388,500 $ktCO_2e$ by 2030, or 30% below the BAU level) are as follows:

Table 5: Tracking progress on the total GHG emissions compared to SPT 1 level

	Unit	Baseline (under the BAU 2030 scenario)	Year			Target level	Target year or period
			2020	2021	2022		
Total GHG Emissions	$ktCO_2e$	555,000	376,301.68	367,668.76	385,941.14	388,500	2030

According to **Table 5**, Thailand's GHG emissions were 376,301.68 $ktCO_2e$ in 2020, 367,668.76 $ktCO_2e$ in 2021, and 385,941.14 $ktCO_2e$ in 2022. The slight decline in emissions in 2021 was primarily due to a reduction in emissions from the energy sector compared to 2020. However, from 2020 to 2022, emissions increased slightly in the Industrial Processes and Product Use (IPPU) sector, mainly driven by growth in the mineral industry, particularly cement production. Additionally, emissions from the agriculture sector saw a significant increase, mainly from rice cultivation, followed by enteric fermentation and direct nitrous oxide (N_2O) emissions from agricultural soils. Similarly, GHG emissions from the waste sector rose considerably due to wastewater treatment and discharge, as well as solid waste disposal[2].

Therefore, Thailand's GHG emissions seem continue to follow an upward trend, posing challenges in meeting its targets. However, the upcoming Climate Change Act will introduce various mechanisms,

[2] Refer from BTR1

including a carbon tax and an Emissions Trading System (ETS), which will serve as essential mechanisms to drive the transition toward achieving these targets.

KPI 2: Annual registrations of Zero Emission Vehicle (ZEV) passenger cars and pick-up trucks

In 2024, the number of registered ZEV Passenger Cars and Pick-up Trucks, as defined under the 30@30 policy, totaled 70,582 vehicles (a decrease from 76,361 vehicles in 2023).

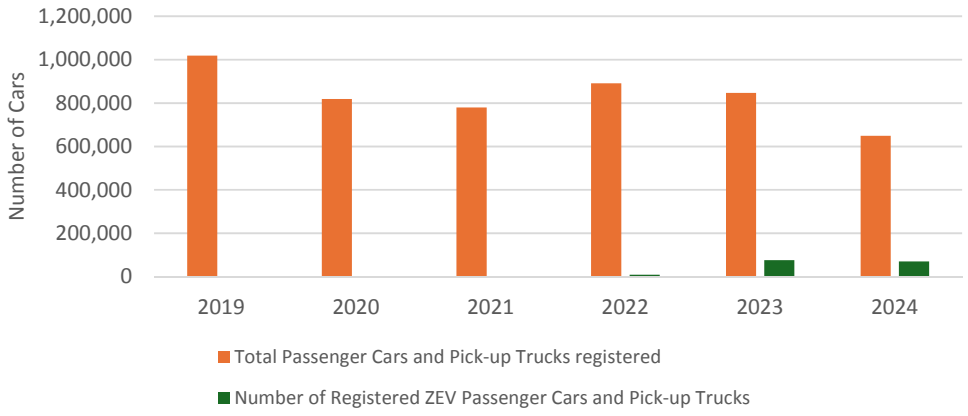
From the **Table 6** and **Figure 2**, in 2024, Thailand's domestic automotive registration of Passenger Cars and Pick-up Trucks declined from a total registered vehicle of 847,385 vehicles in 2023 to 649,280 vehicles in 2024, representing a 23.37% decline. Nonetheless, the increasing penetration of ZEVs out of total passenger cars and pick-up trucks remain, as the market share of ZEVs increased from 9.01% in 2023 to 10.87% in 2024.

Table 6: Number of Registered ZEV Passenger Car and Pick-up Trucks

	Unit	2019	2020	2021	2022	2023	2024
Total Passengers Cars and Pick-up Trucks registered	Car	1,018,722	818,810	779,924	890,615	847,385	649,280
Number of Registered ZEV Passengers Cars and Pick-up Trucks	Car	691	1,288	1,958	9,674	76,361	70,582
% ZEV market share	%	0.07	0.16	0.25	1.09	9.01	10.87
% Achievement Against Target	%	0.16	0.29	0.45	2.20	17.35	16.04
30@30 Policy Target: 440,000 vehicles in 2030							

Source: Department of Land Transport (DLT, 2025)

Figure 2: Numbers of Registered ZEV Passenger Car and Pick-up Trucks



Source: Department of Land Transport

It is understood that the reduction in car sales is due to several factors including but not limited to:

- **High Household Debt**: Despite the government's incentive for electric vehicle purchases, Thailand's household debt levels remain high at 89.6%, data as of Q2 2024 (NESDC, 2024). The elevated debt burden therefore constrained consumer's purchasing power.
- **Stricter Loan Approval Process:** Reportedly, average Non-Performing Loans (NPLs) increased from 1.9% in 2022 to 2.3% in Q3 2024 and fall slightly down to 2.2% in Q4 2024, as illustrated in **Table 7** (BOT, Monetary Policy Report Q4/2024, 2025). High auto NPL rates cause financial institutions to be more hesitant to approval loans for vehicle financing.
- **Initial Surge and Market Saturation**: In 2023, Thailand saw over 689% growth in number of registered ZEV from the previous year. Driven by the substantial incentives provided by the government and compounded with the early adopter enthusiasm – a high baseline was created. Thus, as the market began to saturate and early demand was met, growth rate naturally decelerated in 2024 as observed.

Table 7: Non-Performing Loans (NPLs) of financial institutions (%)

Indicator	Average			2024			
	2022	2023	2024	Q1	Q2	Q3	Q4
Auto Leasing NPL (%)	1.9	2.2	2.3	2.2	2.3	2.3	2.2

Source: Compilation from several Bank of Thailand sources (BOT, Banking Sector Quarterly Brief, 2025)

While the number of registered ZEVs increased significantly from 691 cars in 2019 to 70,582 cars in 2024, the growth rate slowed down from 76,361 cars in 2023, a 7.6% decrease. However, the market share of ZEV continued to rise from 9.01% in 2023 to 10.87% in 2024.

Therefore, in order to achieve the ambitious "30@30 Policy Target" of 440,000 ZEVs by 2030, ZEV sales will need to significantly outperform the total vehicle sales, should this continue on a declining trajectory.

As of December 2024, the total number of ZEV passenger cars and pick-up trucks currently accounts for 16.04% of the 30@30 Policy Target. Despite the downwards trend, additional forward-looking plans have been established to sustain the growth of the electric vehicle industry.

Thailand's Policies, Mitigation Measures and Actions

Overview of Policies

Thailand submitted its second updated NDC and revised the LT-LEDS to the UNFCCC in 2022. These updates strengthened the country's emission reduction targets for 2030, reinforcing the commitments on climate action. The LT-LEDS integrated adaptation towards Thailand's low-carbon development strategy, focusing on sectors vulnerable to climate impacts such as water management, agriculture, food security, tourism, public health and natural resources. Thailand prioritizes sustainable land and water management, strengthening community resilience and fostering of innovation in climate-resilience technologies. These efforts aim to balance climate mitigation and adaptation to enhance nation's resilience.

In addition to the LT-LEDS, Thailand established the National Adaptation Plan (NAP), embedding adaptation strategies into national and local development programs. The NAP was formulated by assessing sector-specific risks using downscaled climate models from the IPCC's Special Report on Emission Scenarios (SRES) A1B scenario. The NAP further aligned with Thailand's key national policies, including the 20-Year National Strategy (2018-2037), the National Climate Change Master Plan (2015-2050), and the Policy and Plan for Enhancement and Conservation of National Environmental Quality (2017-2037). This approach address climate change at the highest policy level, ensuring that economic and social objectives are integrated.

Additionally, more ambitious energy targets are set forth in the sectoral policies such as the Power Development Plan (PDP), the Alternative Energy Development Plan (AEDP), and the Energy Efficiency Plan (EEP). These decarbonization framework covers plans to increase renewable energy shares in the country's power generation portfolio (i.e., ensuring that renewable energy constitutes for at least 50% of new power generation capacity by 2050).

Progress According to Thailand's First Biennial Transparency Report

Thailand's BTR1, submitted in December 2024, marks a significant advancement in the country's climate reporting to be more rigorous and transparent. As it illustrates the transition from the previous Biennial Update Report (BUR) to the Enhanced Transparency Framework (ETF) under the Paris Agreement. The BTR1 presents an updated GHG inventory with data up to 2022, offering a more current assessment of emissions and removals across various sectors.

The BTR1 outlines Thailand's progress in mitigating GHG emissions and commitment to international climate agreement. Key highlights of the performance in 2022 GHG emission reduction compared against projection of GHG emission and removal provided for both "without measures (WOM) scenario" and "with measure (WEM) scenario" as illustrated in **Table 8**.

Table 8: Thailand 2022 Emission Data and Trend Projections

Sector	Most recent Year in Thailand National Inventory Report ($ktCO_2e$)	Projection of GHG emissions and removals ($ktCO_2e$)	
	2022	2030 WOM scenario	2030 WEM scenario
Energy	177,285.89	277,402.41	232,291.89
Transport	77,021.32	148,597.59	51,852.42
IPPU	40,527.22	32,360.00	31,898.69
Agriculture	68,933.74	76,630.00	55,067.00
Waste	21,172.97	20,010.00	17,390.00
Total without LULUCF	**385,941.14**	**555,000.00**	**388,500.00**

Mitigation Measures and Actions

Greenhouse Gas Emissions

1) NDC Action Plan

Thailand submitted its second updated NDC in November 2022, increasing its unconditional GHG emissions reduction target to 30% and its conditional target to 40% below BAU levels by 2030. To translate these commitments into concrete actions, the Thai government approved the NDC Action Plan on Mitigation 2021–2030 (NDC Action Plan) on 11 December 2024. The NDC Action Plan serves as the country's strategic framework to fulfill its commitments under the Paris Agreement by reducing GHG emissions. Developed by the Department of Climate Change and Environment (DCCE) under the Ministry of Natural Resources and Environment, the NDC Action Plan translates Thailand's NDC into actionable measures across key sectors such as energy, transport, industry, waste management, and agriculture. The plan aligns with national policies and international climate goals, ensuring a structured and measurable approach toward achieving Thailand's sectoral GHG emission reduction targets of 30–40% from the BAU scenario by 2030, summary provided in

Table *9*.

The NDC Action Plan encompasses developments across five key sectors with 17 initiatives, targeting a total reduction of 184.8 million tons of CO_2 equivalent ($MtCO_2e$) by 2030[3]. The energy sector is poised to make the most significant impact targeting a reduction of 124.6 $MtCO_2e$, followed by the transport sector with an emission reduction target of 45.6 $MtCO_2e$. These efforts are essential to Thailand's broader and stronger commitment to achieve carbon neutrality by 2050 and net-zero GHG emissions by 2065.

[3] Such reductions are expressed as a reduction against a business-as-usual scenario, and represents the avoided emissions from implementation of GHG reduction measures.

Table 9: Summary of GHG Reduction Targets by Sector under NDC Action Plan

Sector	GHG Emission Reduction Targets in 2030					
	Unconditional Target		Conditional Target[a]			
			In Progress[b]		Needs Support	
	$MtCO_2e$	%	$MtCO_2e$	%	$MtCO_2e$	%
Energy	124.6	22.5	-	-	32.0	5.8
Transport	45.6	8.2	-	-	2.5	0.4
Waste	9.1	1.6	-	-	1.9	0.3
IPPU	1.4	0.3	0.1	0.02		
Agriculture	4.1	0.7	1.0	0.18		
Total	**184.8**	**33.3**	**1.1**	**0.20**	**36.4**	**6.5**
	184.8 $MtCO_2e$ or 33.3%		37.5 $MtCO_2e$ or 6.7% across all measures			
	222.3 $MtCO_2e$ or 40%					

Source: Thailand's First Biennial Transparency Report

Note: a This conditional target is subject to International support which can be accessed in various forms, such as grants and soft loans, with measurable GHG reduction outcomes.
b This progress made toward achieving Thailand's conditional GHG reduction targets.
c The 33.3% is the mitigation reduction potential that was extracted from the NDC Action Plan, whilst the 30% is referenced from the NDC target.

The NDC Action Plan outlines specific policies to support GHG reduction across key sectors, with a focus on energy and transportation.

- **Energy Sector:** The energy sector is crucial for Thailand's emissions reduction efforts, targeting a reduction of 124.6 $MtCO_2e$ by 2030. The National Energy Plan (NEP) will serve as a key strategy to transform the energy sector and support the country's climate goals. The NEP aims to increase the share of renewable energy in power generation to over 50% by 2037, with solar, wind, and biomass as major contributors. The NEP is currently in the drafting stage, with the Power Development Plan (PDP) and Gas Plan undergoing public hearings as part of the approval process, with a planned launch in July 2025.
- **Transportation Sector:** The transport sector aims to reduce emissions by 45.6 $MtCO_2e$. Key policies include promoting electric vehicles (EVs), expanding Mass Rapid Transit (MRT) systems, and improving river logistics efficiency. The "30@30" policy targets 30% of new vehicles produced in Thailand to be zero emission vehicles by 2030. Furthermore, Thailand plans to phase out internal combustion engine vehicles after 2035, transitioning towards cleaner transportation options.
- **Waste Sector:** In the waste sector, Thailand targets a reduction of 9.1 $MtCO_2e$. Policies focus on improving waste management practices, such as recycling and waste-to-energy technologies, to minimize methane emissions.
- **IPPU Sector**: IPPU sector aims for a reduction of 1.4 $MtCO_2e$. Strategies include improving energy efficiency in industries and promoting cleaner production processes.

- **Agriculture Sector:** The agriculture sector targets a reduction of 4.1 $MtCO_2e$. Policies focus on promoting climate-resilient agriculture practices and efficient irrigation systems to reduce emissions while enhancing productivity.

These sectoral policies are integral to Thailand's broader commitment to achieve carbon neutrality by 2050 and net-zero greenhouse gas emissions by 2065.

2) Climate Change Act[4]

The Climate Change Act of Thailand aims to establish a comprehensive legal framework to drive the country's GHG reduction efforts, aligning with national climate goals and supporting sustainable development and green finance. The Climate Change Act will establish the legal foundation for the implementation of a number of carbon pricing mechanisms, including an ETS for high-emissions facilities and businesses and a carbon tax on petroleum-related products. These measures will directly contribute to Thailand's efforts in achieving its GHG emission reduction targets.

1. **Legal and Institutional Framework:** The Climate Change Act establishes the National Climate Change Policy Committee, responsible for setting policies, defining mitigation targets, and integrating climate action across government agencies. By mandating climate considerations in national development plans, the Climate Change Act strengthens Thailand's governance and ability to implement effective policies.
2. **Climate Mitigation and Carbon Pricing:** The Climate Change Act enforces GHG reduction targets aligned with Thailand's NDC and introduces carbon pricing mechanisms, including ETS and a carbon tax. These measures provide financial incentives for industries to reduce emissions, invest in low-carbon technologies, and maintain competitiveness in global markets.
3. **Climate Finance and Investment:** To mobilize resources for climate action, the Climate Change Act establishes a Climate Fund to support mitigation and adaptation projects. It also promotes green finance instruments, such as green bonds, SLBs, and carbon credit trading, encouraging private sector investment in sustainable initiatives.
4. **Monitoring, Reporting, and Verification (MRV):** The Climate Change Act introduces a mandatory GHG emissions reporting system, ensuring transparency and compliance through an MRV framework. This system strengthens accountability and effectively tracks progress toward emissions reduction targets.
5. **Sectoral and Cross-Border Actions:** The Climate Change Act enforces GHG reduction measures across key sectors such as energy, transportation, industry, waste, and agriculture. It also introduces a cross-border carbon pricing mechanism to prevent carbon leakage and align Thailand with global carbon markets.

[4] *At the time of preparing this Progress Report, Thailand's Climate Change Act remains in currently a draft form.*

By providing a strong regulatory foundation for GHG mitigation through a structured legal and economic framework, the Climate Change Act serves as one of the key strategies to achieve SPTs outlined in the SLB Framework. The Climate Change Act also strengthen the country's confidence in achieving the climate commitments. More broadly, it strengthens Thailand's ability to meet its net-zero emissions target by 2065, ensuring a just and sustainable transition to a climate-resilient economy.

3) National Energy Plan[5]

The energy sector, as the country's largest source of GHG emissions, plays a central role in Thailand's transition towards carbon neutrality and net zero. Thus, to support the achievement of national goals, the Energy Policy and Planning Office (EPPO) developed the National Energy Plan (NEP), which integrates five key energy policies: the PDP, AEDP, EEP, Oil Plan, and Gas Plan. This strategic framework aims to:

- **Achieve Carbon Neutrality:** Commit to attain carbon neutrality between 2065 through the adoption of advanced energy technologies, increased reliance on renewable energy sources and implementation of energy efficiency measures.
- **Enhance Energy Efficiency:** Reduce energy consumption intensity via measures such as the adoption of electric vehicles (EVs) and improving energy efficiency across all sectors.
- **Stimulate Economic Investment:** The NEP project is expected to attract approximately 2.9 trillion baht in capital investment during the period of 2024-2037 (13 years), to drive initiatives in the clean energy sector.

Key initiatives and targets for the relevant subsectors mainly focus on the energy and transportation sectors which are the main sources of GHG emissions:

Energy Sector

- **Renewable Energy Expansion**: Increase the share of electricity generated from renewable source to over 50% by 2037, with solar, wind, and biomass being major contributors. This expansion may be supported by additional mitigation technologies such as solar PV with battery storage. Additionally, biomass-based power plants may be equipped with carbon capture, utilization and storage (CCUS) technology to further reduce emissions.
- **Reduction in fossil fuels:** The share of gas in power generation is expected to decline to 41% by 2037 from 57% in 2023. Similarly, coal is projected to decrease significantly to 7% by 2037 from 20% in 2023 (Prakobchat, 2024).
- **Introduction of Hydrogen:** Approximately 5% of natural gas fuel will be substituted with hydrogen in east pipeline for power generation in the short term (i.e., 2020 – 2030), with plants to increase this share by up to 20% (i.e., 2031 – 2040) (EPPO, 2024) .

[5] *At the time of preparing this Progress Report, National Energy Plan is currently a draft version.*

Transportation

- **Electric Vehicle (EV) Promotion and infrastructure development**: To increase the share of zero emission vehicles in the market to at least 30% in 2030 involves developing EV charging infrastructure to support widespread adoption with a goal of phasing out internal combustion engine vehicles after 2035. Additionally, the transition will require upgrading combustion standards from EURO 5 to EURO 6 emissions standards. Initiatives outlined in the NEP will be reviewed and updated every 3-5 years, with annual monitoring to ensure the achievement of targets.
- **Public Transportation Upgrades**: To convert public transportation systems from internal combustion engines to electric vehicles, with a focus on buses and other public vehicles. Additionally, the expansion railway networks, including double-tracking and high-speed trains, will be prioritized to reduce emissions and enhance overall efficiency.
- **Travel Demand Management and Sustainable Transport Systems**: To promote Transit-Oriented Development (TOD), which integrates public transport with residential and commercial areas. The expansion of Mass Rapid Transit (MRT) systems aims to increase the use of efficient public transport. Additionally, improving river logistics efficiency will further reduce emissions from transportation, contributing to greater sustainability in the sector.

This policy supports the implementation of strategies to achieve the SPTs outlined in the SLB framework by providing a structured approach that incorporates key plans related to power generation, alternative energy development, energy conservation, and natural gas and fuel management. It contributes to carbon reduction strategies and ensures that the SLBs contribute to Thailand's broader climate commitments.

Electric Vehicles

In addition to the mandate to implement GHG reduction measures in the transport sector, the National Electric Vehicle Policy Board approved the EV 3.5 Package (2024-2027) seeking to sustain the growth of the ZEV industry and attract new investments. The initiative offers comprehensive support across the entire EV ecosystem, including incentives for both manufacturers and consumers. Key offerings include:

- **Financial incentives:**
  - Subsidies for EV Purchases: The government offers subsidies for electric passenger cars and pickup trucks with subsidy amounts dependent on the vehicle type and battery capacity (BOI, 2023).
    - *Electric Passenger Car (price not exceeding 2 million baht)*
      - Battery capacity ≥ 50 kWh, subsidy between THB 50,000 – 100,000 per unit
      - Battery capacity < 50 kWh, subsidy between THB 20,000 – 50,000 per unit
    - *Electric Pickup Trucks (price not exceeding 2 million baht)*
      - Battery capacity ≥ 50 kWh, subsidy between THB 50,000 – 100,000 per unit
  - Tax Reductions: Electric passenger cars prices not exceeding THB 7 million benefit from an excise tax reduction from 2% to 8%. Furthermore, for vehicles priced not exceeding THB 2 million,

importing electric vehicles as Completely Built-up Unit during 2024-2025 can also benefit reduced import duties of up to 40%.

- **Production obligations:** To encourage local production, manufacturers are required to adhere to specific production rations (i.e., by 2026, produce two locally assembled vehicles for every imported unit, and by 2027, three locally assembled vehicles for every imported unit).
- **Adjusted Production Timeline:** To prevent an oversupply of electric vehicles in the market and potential price wars, the government has extended production timeframes for battery electric vehicles manufacturing. The requirements to produce one local vehicle for each imported unit will gradually increase to 1.5 in 2025, 2 in 2026, and 3 in 2027.

To support EVs production, several initiatives, including tax breaks and consumer subsidies, have been introduced to attract investment from manufacturers such as China's BYD and Great Wall Motor. Additionally, Thailand's Board of Investment has noted that Mazda Motor Corporation plans to invest THB 5 billion in Thailand for the production of compact electric vehicles. Furthermore, the EV 3.5 Package is expected to significantly enhance investment in the EV manufacturing sector and drive greater EV adoption among consumers. Continuous monitoring of SPT 2 progress will be conducted to assess its impact.

Calculation Methodology

GHG Emissions

Thailand's GHG inventory was developed and submitted in accordance with Article 4 and 12 of the UNFCCC and Article 13 of the Paris Agreement. Thailand's GHG inventory encompasses emissions and removals from various sectors, including Energy, IPPU, Agriculture, LULUCF, and Waste. Estimated emissions were prepared based on the 2006 IPCC Guidelines, and any subsequent versions or refinement of the IPCC Guidelines and recorded on the TGEIS platform. TGEIS is a robust architecture enabling standardized data collection, effective compilation, reporting and verifying emission data whilst ensuring alignment with international standards. Both direct and indirect emissions are recorded as details in **Table 10.**

Table 10: List of recorded direct and indirect emissions in TGEIS

Direct Emissions	Indirect Emissions
Carbon Dioxide (CO_2)	Nitrogen Oxides (NOx)
Methane (CH_4)	Carbon Monoxide (CO)
Nitrous Oxide (N_2O)	Non-Methane Volatile Organic Compounds (NMVOCs)
Hydrofluorocarbons (HFCs)	Sulphur Dioxide (SO_2)
Perfluorocarbons (PFCs)	
Sulphur Hexafluoride (SF_6)	
Nitrogen Trifluoride (NF_3)	

For each sector, Thailand adopted a combination of Tier 1 and Tier 2 methodologies[6] depending on the availability of data (e.g., direct and indirect GHGs) and country-specific emission factors, details as follows:

- **Energy Sector:** Emissions from fuel combustion and fugitive emission were estimated using activity data from national energy statistics. Tier 1 approach was primarily used.
- **Industrial Processes and Product Use:** Emissions were calculated based on production data from industries. Tire 1 methodology was applied.
- **Agriculture:** A combination of Tier 1 and Tier 2 are used, for example categories like Enteric Fermentation and Manure Management, tier 2 approach was adopted, using country-specific

[6] Tier 1 and Tier 2 methodologies are methodologies used for estimating greenhouse gas emissions according to the 2006 IPCC Guideline for National Greenhouse Gas Inventories, each representing a different level of complexity and data specificity.
Tier 1: The simplest, utilizing default emission factors and parameters provided by the IPCC. It requires minimal country-specific data and is designed to be applicable even when detailed information is lacking.
Tier 2: The intermediate approach involves the use of country-specific emission factors and more detailed activity data. By incorporating national statistics and characteristics, Tier 2 aims to provide more accurate emissions estimates compared to Tier 1.

emission factors derived from local studies. Whilst other categories, such as rice cultivation and agricultural soils, adopted the tier 1 methodology with default emission factors.

- **Land Use, Land Use Change and Forestry:** Tier 2 methodology was applied across all subcategories, utilizing national forest inventory data and remote sensing.
- **Waste:** Emission from solid waste disposal, wastewater treatment and waste incineration were estimated using Tier 1 approach.

To calculate GHG emissions using the TGEIS, following the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, the focus is on direct GHG emissions, including Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulphur Hexafluoride (SF_6) from the Energy, IPPU, Waste, and Agriculture sectors. This calculation is linked to Thailand's SLB through the use of Total GHG Emissions (excluding removals from LULUCF) as a KPI, with data reported annually in the SLB Progress Report and biennially in the BTR.

Electrical Vehicle Registration

Under the SLB Framework, KPI 2 is defined as the annual registration of ZEV passenger cars and pick-up trucks as defined in the Motor Vehicle Acts. Thailand has seventeen classification of vehicle types defined in the Motor Vehicle Act, covering sedans, vans, taxis, motorcycles and tractors etc. However, according to the discussion with the Excise Department and the Board of Investments (BOI), the following types of vehicles shall be included as “passenger cars and pick-up trucks” under the 30@30 policy.

- Sedan, not more than 7 passengers (Code: Ror.Yor 1)
- Microbus and Passenger Van (Code: Ror.Yor 2)
- Van and Pick-up (Code: Ror.Yor 3)
- Interprovincial Taxi (Code: Ror.Yor 5)
- Urban Taxi (Code: Ror.Yor 6)
- Hotel Taxi (Code: Ror.Yor 9)
- Tour Taxi (Code: Ror.Yor 10)
- Car for Hire (Code: Ror.Yor 11)

The active advancement of adopting electric vehicles is a key strategy to meet the NDCs and facilitate green transition. According to the discussions with the BOI and Excise Department, the baseline year was agreed to be 2023 as it is the most recent and presented as most reliable. Registration data have been derived and consolidated from the raw data disclosed on the DLT website and cross-checked against information disclosed by the Thailand Automotive Institute (TAI) website. No deviations between the two sources were identified.

External Verification

Reports from both independent verifiers concludes that the 2022- 2024 data is accurate.

KPI 1

KPI 1 data (report date 28 December 2022) has been externally verified.

Performance of KPI 1 for the year 2022 will be reviewed and verified as part of the NDC process performed by the team of technical experts of the UNFCCC via the International Consultation and Analysis process. A summary report is available on the UNFCCC website.

KPI 2

KPI 2 data for 2024 has been externally verified.

Performance of KPI 2 for the year 2024, was reviewed and verified by United Nations Development Programme (UNDP). A limited assurance verification report is available on the PDMO website.

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