Thailand Background

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THAILAND
TAXONOMY BOARD

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1. Global context

Climate emergency is one of the most pressing issues the world is facing today. Global net anthropogenic greenhouse gas (GHG) emissions were about 12% higher in 2019 than in 2010 and 54% higher than in 1990[1]. According to the Intergovernmental Panel on Climate Change (IPCC), current world policies on GHG emission mitigation announced before the COP 26 conference in November 2021 are unlikely to lead us to limiting global warming to 1.5°C during the 21st century. Even limiting it to 2°C will require tremendous efforts from all members of the world community. IPCC climate modelling shows that in order to maintain temperatures below 1.5°C, it is necessary to reduce anthropogenic emissions at least by 45% compared to 2010 before 2030 and to reach net-zero emissions by 2050.

Table 1 Classification of climate-related hazards[2]

	Temperature-related	Wind-related	Water-related	Solid mass-related
Chronic	• Changing temperature (air, freshwater, marine water • Heat stress • Temperature variability • Permafrost thawing	• Changing wind patterns	• Changing precipitation patterns and types (rain, hail, snow/ice) • Precipitation or hydrological variability • Ocean acidification • Saline intrusion • Sea level rise • Water stress	• Coastal erosion • Soil degradation • Soil erosion • Solifluction

[1] IPCC. (2022). Summary for Policymakers

[2] Developed by EU Technical Expert Group

	Temperature-related	Wind-related	Water-related	Solid mass-related
Acute	• Heat wave • Cold wave/frost • Wildfire	• Cyclone, hurricane, typhoon • Storm (including blizzards, dust and sandstorms) • Tornado	• Drought • Heavy precipitation (rain, hail, snow/ice • Flood (coastal, fluvial, pluvial, ground water) • Glacial lake outburst	• Avalanche • Landslide • Subsidence

Without ambitious climate change mitigation actions, the world will experience negative consequences of climate change on a scale never envisioned before, and some of this change will be irreversible. Increased heatwaves, droughts and floods are already exceeding plants' and animals' tolerance thresholds, driving mass mortalities in species such as trees and corals. Hundreds of millions of people living in the coastal areas will be among the first to experience worsening living conditions, but the rest will follow soon. Acute food and water shortages all over the world will change the lives of billions and seriously undermine the prospects of future generations.

In this context, climate change also causes economic impacts which translate into financial risks. A recent risk survey by the World Economic Forum found that 3 out of the top 5 perceived most important global risks in terms of impact are climate-related (i.e., climate action failure, biodiversity loss, and extreme weather). More than 200 of the world's largest firms estimate that climate change will generate a total cost of USD 1 trillion in damage to economy and people's livelihood if appropriate actions are not taken. Consequently, insurances could become unaffordable or unavailable for several businesses and individuals. In 2018, the global "catastrophe protection gap", referring to assets that should have been insured but were not, equalled almost USD 280 bn[3].

[3] Asian Development Bank. (2021). Accelerating Sustainable Development after COVID-19: The Role of SDG Bonds

The Association of Southeast Asian Nations (ASEAN) region and its 640 million people are particularly vulnerable to the consequences of climate change, given that 450 million live near retreating shorelines. The Asian Development Bank (ADB) estimates that Southeast Asia needs USD210 bn annually till 2030 for investments in climate-resilient infrastructure and notes the private sector's important role in closing gaps in public finance for these investments.

2. Thailand and climate change

Evidence shows that Thailand is highly vulnerable to the negative impacts of climate change and heavy rainfalls, floods, droughts, cyclones, and storm surges are among the country's significant extreme hazards. Floods, including riverine, flash, and coastal flooding, are by far the most significant hazard in terms of economic and human impacts[4], followed by droughts and cyclones.[5] Reflecting very high exposure to these hazards, Thailand was ranked the 30th most affected country globally by extreme weather events between 1993–2022.[6] These events may intensify under future climate scenarios. For example, it is projected that the number of people in Thailand affected by an extreme river flood could grow by over 2 million during 2035–2044, and coastal flooding could involve a further 2.4 million people during 2070–2100[7].

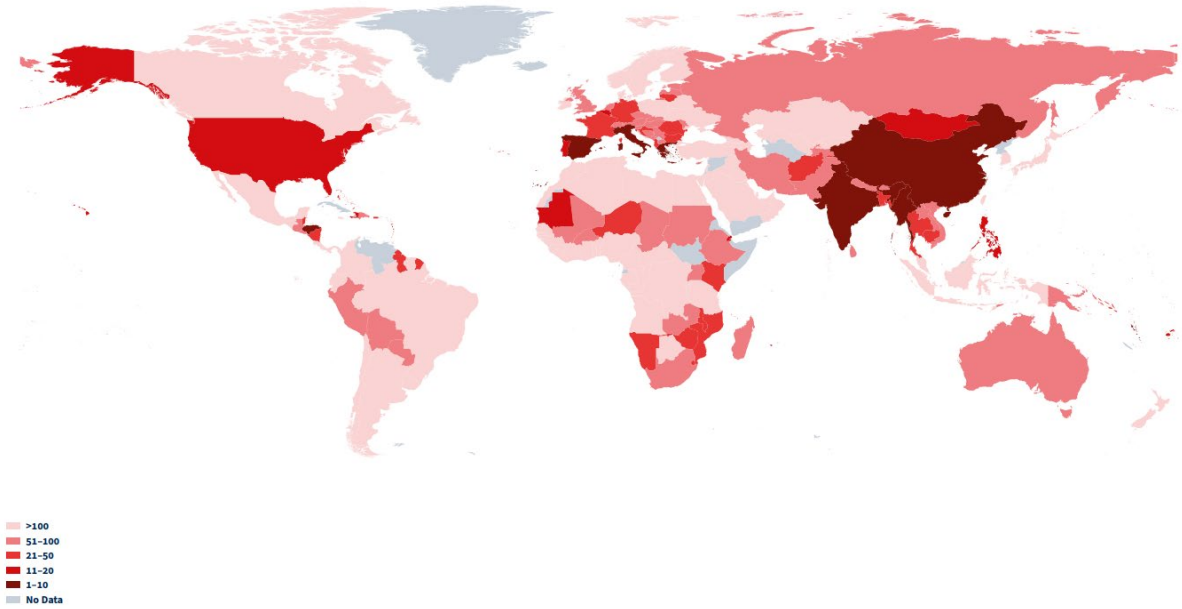
[4] World Bank, Asian Development Bank. (2021). Climate Risk Country Profile Thailand

[5] European Commission. (2022). Inform Index for Risk Management. Thailand – Country Profile 2022 Scores

[6] German Watch. (2025). Global Climate Risk Index 2025.

[7] UN International Organisation for Migration. (2023) Country Factsheet: Thailand.

Figure 1 Climate risk index: Overall ranking 1993 - 2022



Source: GermanWatch, 2025

Thailand is also exposed to slow-onset climate change impacts from rising sea levels, rising temperatures, and fluctuations in precipitation regimes. Observations show temperature increases across Thailand since the mid-20th century and an increase in annual precipitation, with most of this increase occurring during the wet season. Thailand's Fourth Biennial Update Report (BUR4) (2022) highlighted Thailand's coastal zone as one of the most vulnerable areas at greater risk of intensive flooding resulting from sea-level rise and coastal erosion[8]. In addition to sinking land, the combination of rising seas and potential cyclone-induced storm surges threaten large amounts of Thailand's critical public and private infrastructure in low-lying areas, including Bangkok, which is often ranked among the most climate vulnerable cities in the world.

3. National context

Thailand has been an upper middle-income country since 2011 and has experienced successive decades of remarkable economic and social development, including substantial progress toward Sustainable Development Goals (SDGs). In 2025, Thailand ranked 43rd

[8] UNFCCC, Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment. (2022). Thailand. Biennial update report (BUR). BUR 4

globally, improving two positions from 45th in 2024[9], and remained the top performer in ASEAN. Despite this progress, Thailand's economic growth continues to face structural challenges and competitiveness issues. Between 2022 and 2024, GDP growth was 2.6%, 2.0%, and 2.5%[10], respectively—below the regional average. This highlights two key challenges: enhancing economic competitiveness and advancing climate-resilient, low-carbon development, which are essential pillars for long-term sustainable growth.

While adapting to these impacts of climate change is a priority, Thailand also needs to simultaneously engage in ambitious climate mitigation actions by reducing GHG emissions across key economic sectors. According to the First Biennial Transparency Report (BTR1), from 2000 to 2022, the energy sector was the largest contributor to GHG emissions, increasing by 53.2% from 165,993.49 ktCO2eq in 2000 to 254,307.21 ktCO2eq in 2022.

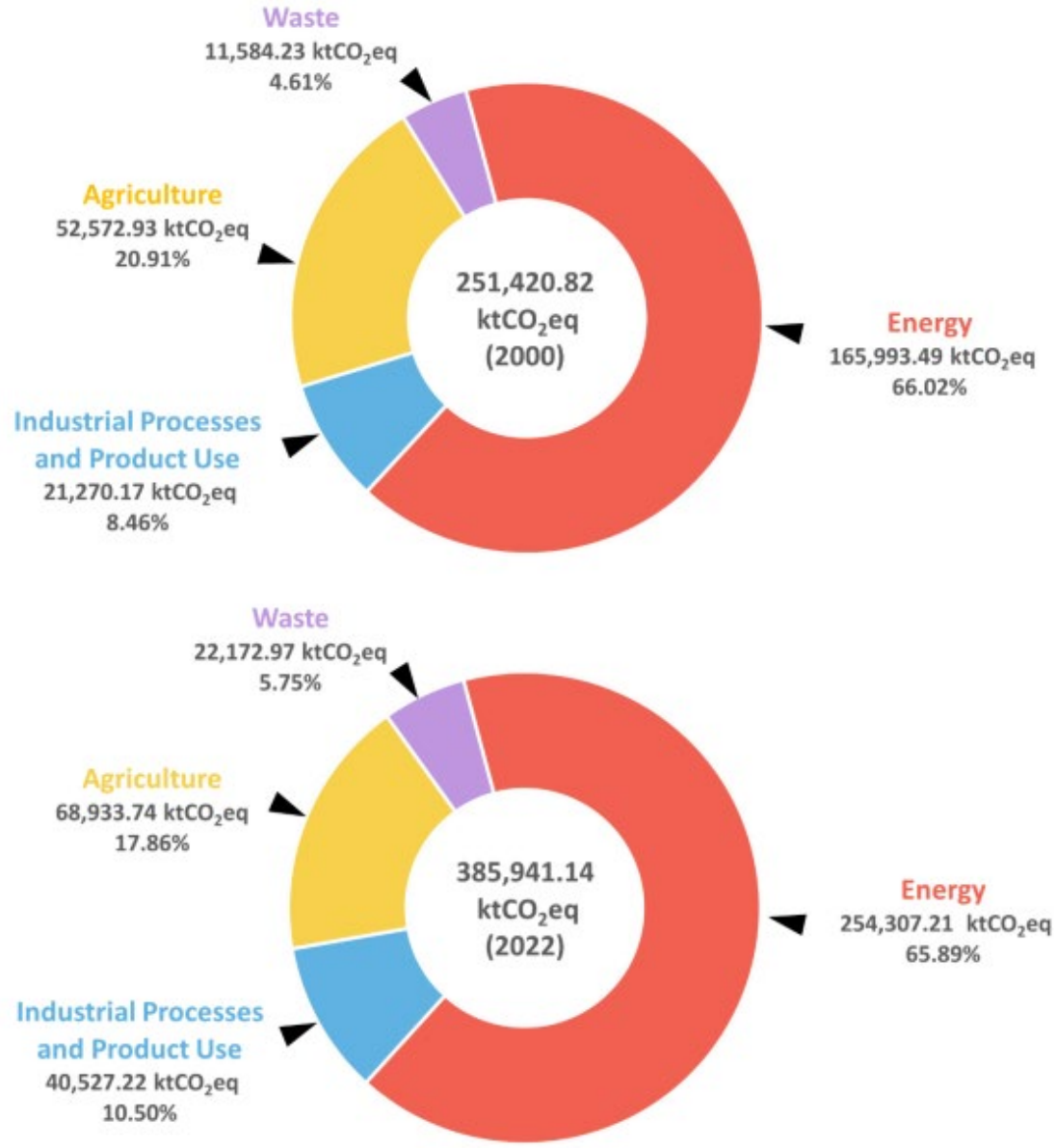
the Agriculture, IPPU, and Waste sectors in 2018 were 16%, 11%, and 4%, respectively.

In 2022, Thailand's total GHG emissions (excluding land use, land-use change, and forestry – LULUCF) were 385,941 ktCO2eq, while net emissions were 278,040 ktCO2eq, accounting for carbon removals of -107,901 ktCO2eq from LULUCF. The energy sector accounted for 66% of total emissions, making it the most critical sector for mitigation efforts. Agriculture, industrial processes and product use (IPPU), and waste contributed 18%, 11%, and 6%, respectively.

[9] SDG Move. (2025). *SDG Index 2025: Thailand Moves Back to 43rd Globally, Maintains Top Spot in ASEAN – Six Goals Identified as Highly Challenging*. https://www.sdgmove.com/2025/06/24/sdg-index-2025-thailand/

[10] World Bank. (2025). *Thailand GDP Growth (Annual %)*.
https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=TH

Figure 2 Thailand GHG Emission Profile (Excluding LULUCF) in 2000 and 2022



Source: Thailand's First Biennial Transparency Report[11]

[11] Department of Climate Change and Environment. (2024). *Thailand's First Biennial Transparency Report (BTR1)*. Bangkok: Ministry of Natural Resources and Environment. https://www.dcce.go.th/wp-content/uploads/2024/12/Submitted-1st-BTR_compressed-1.pdf

4. Demand for more investment in climate change mitigation, adaptation and resilience

Among the significant extreme hazards, flooding accounts for nearly 100% of the average annual loss associated with hazards.[12] Major flood events in Thailand have affected the entire economy in the past. For example, a single flood in 2011 caused a total loss and damages cost of THB1.43 trillion (USD46.5 billion), or equivalent to roughly a 1.1% loss in real GDP in 2011. Overall, the 2011 floods affected more than 13 million people and resulted in more than 680 deaths. The damage to buildings, equipment and machinery in the industry sector alone amounted to THB 513.9 billion.[13]

Storms and droughts have also caused some significant negative impacts on Thailand's economy. Droughts occur almost every year, affecting more than 10 million people, resulting in average economic damages of THB 0.6 billion (USD 20 million) annually and could cause financial losses of up to 0.1% of GDP. Thailand also incurs an average of THB 0.2 billion (USD 6 million) in damages annually from storms that lead to nationwide floods and landslides.[14] Apart from extreme events, Thailand also faces the effects of long-term incremental changes from climate change. For example, projections suggest that Thailand's agricultural sector could be significantly affected by a changing climate due to its location in the tropics, where agricultural productivity is particularly vulnerable to temperature rises, rice yields, and the eastern, south-central, and north-eastern areas are most likely to be negatively impacted.

In term of sectoral impacts, given that around 47% of land use in Thailand is dedicated for agriculture and around 30% of the Thai labour force still participate in the agricultural sector, the vulnerability of the agricultural sector to climate change is a key concern. Apart from agricultural sector, other climate vulnerable sectors are water resource management, public health, tourism, natural resource management and human settlement and human security.

In terms of vulnerable groups, studies highlighted that climate change's highest economic and social impacts would likely fall disproportionately on the poorest and marginalised groups and

[12] World Bank, Asian Development Bank. (2021). Climate Risk Country Profile Thailand

[13] World Bank. (2012). Thai Flood 2011 : Rapid Assessment for Resilient Recovery and Reconstruction Planning

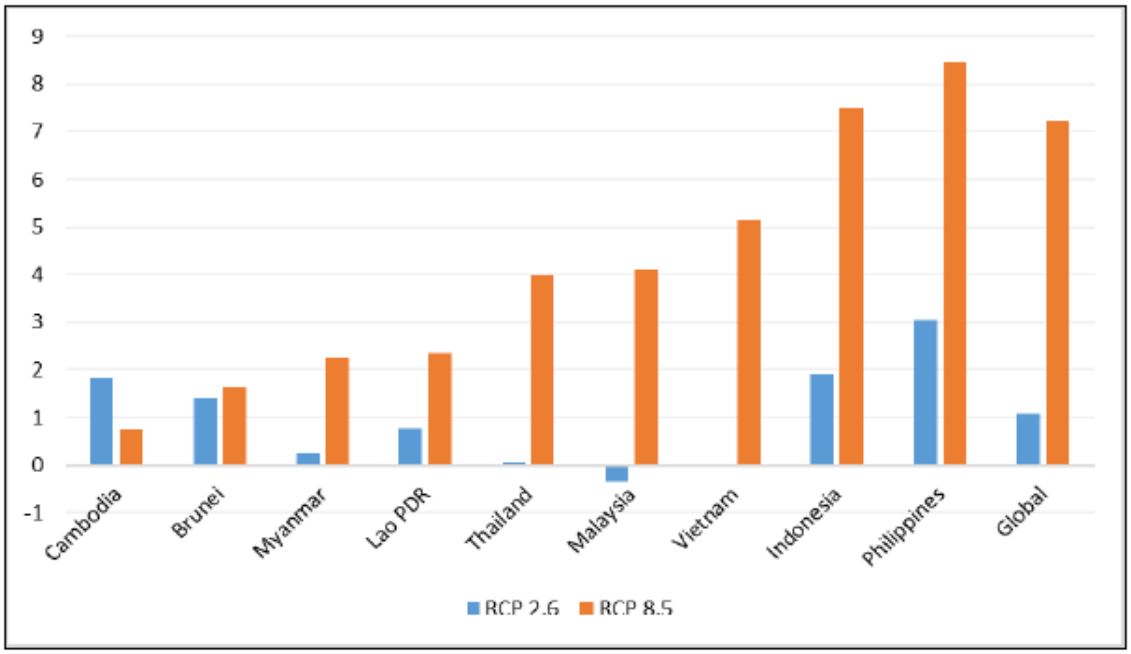
[14] UNDP, Fiscal Policy Research Institute. (2022). Final Report: Conducting a Country Diagnostic on Inclusive Insurance and Risk Finance for Thailand

regions. As Thailand is an aging society which projected to be a “super-aged society” by 2035, the country will be home a large segment of aged population who will be particularly vulnerable to the impacts of climate change. From the human health perspective, the effects of temperature rise and heat stress in urban areas, compounded by the phenomenon of Urban Heat Island, as well as the impacts of climate change on vector-borne diseases, food security, and nutrition, are also of particular concern. These climates change impacts on public health could negatively affect Thailand’s economy through channels such as reduced labour productivity and human capital accumulation.

With accelerating global temperatures and the increased frequency of extreme events, future impacts from climate change on Thailand are likely to intensify. Therefore, more investments in adaptation and resilience are needed to address the effects of climate-related hazards on the Thai economy. Without adequate adaptation and resilience investments, Thailand could see severe dents to GDP per capita due to climate change, with potential losses up to 4% of GDP in the year 2100, depending on future emission scenarios and the breadth and depth of adaptation actions taken.

On the other hand, more investments adaptation and resilience could provide new economic opportunities for Thailand in the post-COVID era to attract new capital towards innovative projects, for examples, in smart water management, climate-smart agriculture, coastal rehabilitation and climate-resilient infrastructure. Apart from bringing new green jobs, these investments are consistent with Thailand’s NDC, which emphasises the opportunity from pandemic recovery to “build back better” an ecosystem and economy that is climate-resilient and sustainable.

Figure 3 Thailand's potential loss in GDP per capita from climate change by 2100 compared to other ASEAN countries



Source: Anwar et al. (2020)

Note: RCP 2.6 corresponds to the Paris Agreement's 2-degree goal achieved; RCP 8.5. is an unmitigated scenario in which emissions continue to rise throughout the 21st century.

Current efforts to accelerate the decarbonisation of the economy present both challenges and opportunities for Thailand. On the one hand, the country is facing key constraints and gaps in decarbonisation efforts, including high investment costs, particularly costs of technologies and infrastructure, and a high level of technical capacity and effective coordination needed across different sectoral agencies. Given these constraints, there has been concern about the potential impacts of GHG emission reduction actions on the country's economic growth, with some predicting slight GDP losses (-0.3 to -0.5%) from 25-40% GHG emission reductions compared to a BAU scenario.[15]

On the other hand, studies also highlighted the potential positive economic effects of transition to a net-zero economy. For example, a World Bank study predicts that a shift towards a circular economy could increase Thailand's GDP by about 1.2% and create nearly

[15] Thammasat University. (2020). The revision and update of Thailand's Long-Term Low Greenhouse Gas Emission Development Strategy (LT-LEDS) and Thailand's National Determined Contribution (NDC).

160,000 additional jobs by 2030, representing approximately 0.3% of total employment.[16] A KPMG study also ranks Thailand among seven countries to watch globally regarding net-zero readiness, as Thailand has significant opportunities to decarbonise through large-scale projects and emerging initiatives, including green industry standards, public transport, and the manufacturing of electric vehicles.[17] In the long term, the net effects of the transition to net-zero on the Thai economy will likely depend, among others, on access to financing for green investments, the adoption of appropriate technologies across economic sectors, and the ability to create co-benefits from GHG reductions (such as green jobs, reduced public health burden from pollutions etc.).

5. Local environmental issues, causes, and mitigation

Thailand also faces multiple local environmental issues such as pollution, including air and water quality, waste management, and management and conservation of natural resources and biodiversity.

Air

- While overall air quality in the country was better in April 2020 than the previous year, there were critical areas where air pollution still caused problems. These include the problems of PM2.5 in Bangkok and its vicinity, of volatile organic compounds (VOCs) in industrial areas, and of haze in Northern provinces, resulting from agricultural burning in combination with dry weather leading to the rapid spread of forest fire.

Water

- Out of the water quality of 59 water sources and 6 still water resources, 2% was in excellent quality (equal to 2019), 37% was in good quality (9% increased from 2019), 43% was in fair quality (7% decreased from 2019), and 18% was in poor quality (equal to 2019).
- The overall coastal water quality was better in 2020 than in the past 10-year period, except in the Gulf of Thailand, which continues to face poor water quality problems.

[16] World Bank. (2022). Thailand Economic Monitor June 2022: Building Back Greener: The Circular Economy

[17] KPMG. (2021). Net Zero Readiness Index 2021

- Key measures being implemented to address the water quality, air and pollution problems include improvements in guidelines and standards, inspection and enforcement of pollution sources, and incorporating of management standards as a criterion for business permits etc.[18]

Waste

- Waste generation in Thailand averages 1.13 kg. per capita per day, leading to 27.8 million tons of solid waste produced per year. In the Bangkok Metropolitan Region, plastic waste accounts for 20% of the total of 10,500 tons of waste per day, of which only 25% is recycled.[19]
- Thailand averages plastic waste generation of 74 kg. per capita per year, which is much higher than the world average of 29 kg. in 2018. In general, plastic waste is not fully and properly collected and managed. As result about 336,000 tons of plastics leak into the oceans annually, amounting to 4.8 kg. per capita per year.[20]
- Compared to energy, agriculture, and transport, the waste GHG emissions remained small but steadily increased from 10.83 tons of CO2 equivalent in 2010 to 12.58 tons of CO2 equivalent in 2016.
- The pandemic also created a new crisis of surging medical and plastic waste. The amount of plastic waste generated during pandemic was approximately 6,300 tons per day, equivalent to a 15% increase from regular periods with about 5,500 tons per day.[21]
- The Government of Thailand has considered environmental problems from solid waste generation more than ever before, especially as the country is adopting the circular economy approach. Recently, the Government has also approved the Roadmap on

[18] Pollution Control Department, Ministry of Natural Resources and Environment. (2021). Thailand State of Pollution 2020 (B.E. 2563) (Volume 26, 5 March 2021 (B.E. 2564)

[19] All Around Plastics. (2021). Exploring the Perspective: "Environmental Problems are Problems for Everyone" with Dr. Wijarn Simachaya, President of the Thailand Environment Institute

[20] UCN. (2020). Thailand

[21] Pollution Control Department, Ministry of Natural Resources and Environment. (2021). Thailand State of Pollution 2020 (B.E. 2563) (Volume 26, 5 March 2021 (B.E. 2564)

Plastic Waste Management 2018–2030 with an ambition to recycle all plastic waste by 2027.[22]

Thailand is endowed with rich ecosystems and biodiversity, but these resources face threats from unsustainable practices and inadequate conservation and management in some key respects.

Forests

- For example, while total forest area in Thailand has been recently relatively stable, accounting for 31.68%, 31.67%, and 31.63% of total country area in 2018, 2019 and 2020 respectively, deforestation and forest fires remain a problem.[23]
- To address this, the 5th strategy of the 20-Year National Strategy (2018-2037)—*environmentally growth for sustainable development*—aims to prevent deforestation and increase forest areas to 55% by 2037.
- In 2020, Thailand also expanded forest conservation from 105696 km^2 in 2006 to 116304 km2, equivalent to 23 % of the total land area, including 22 national parks extending across 6,416 km^2.

Coasts

- Coastal resource management and conservation are also key challenge for Thailand. The country's coastal resources and wetlands have degraded, with some 77% of the coral reefs being devastated by activities linked to tourism, rising from 30% a decade ago.[24]
- In 2018, 30% of the coastlines were at critical levels of erosion, with more than 5 meters of erosion per year.[25] Land subsidence, land use change from aquaculture and residential expansion, and mass tourism are all driving coastal erosion in Thailand.

[22] Pollution Control Department, Ministry of Natural Resources and Environment. (2021). Thailand Roadmap on Plastic Waste Management 2018–2030

[23] UNFCCC, Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment. (2022). Thailand's Fourth National Communication

[24] UNDP. (2021). The Biodiversity Finance Plan – The Biodiversity Finance Initiative (BIOFIN) – Thailand

[25] Nation Thailand. (2018). Experts Contradict Govt on Coastal Erosion

Climate change is also exacerbating these erosions through its effects on sea level rise and intensified storms.

Mangroves

- Thailand has good achievements regarding mangrove conservation, but more resources are needed to sustainably manage these coastal resources. Even though Thailand had lost 56% of its mangrove cover during 1961–1996, the effects of coverage loss were mitigated by the government policy shift from mangrove exploitation towards mangrove conservation and restoration in 1998.[26]
- During 2002–2012, the rate of mangrove loss was significantly slower in Thailand[27] compared to other Southeast Asian countries. Thailand has also been uniquely successful in implementing community-based mangrove management, that can be primarily attributed to internal community capacity, government support, and promotion of community-based models.[28]
- While solid policy measures to expand mangrove restoration exist, there is still under-investment in sustainable coastal management projects involving nature-based solutions, particularly when compared to the extensive ecosystem benefits, they bring, especially in avoiding long-term physical and financial losses.[29]
- More investment in sustainable coastal management projects—particularly in the mangrove areas—presents a promising opportunity to promote green COVID-19 recovery with solid involvement from coastal communities while contributing to climate adaptation and mitigation goals under the NDC.

[26] Global Mangrove Alliance. (2018). Pakistan-Thailand-Vietnam

[27] Richards and Friess. (2016). Rates and drivers of mangrove deforestation in Southeast Asia, 2000–2012

[28] Poonsri Wanthongchai, Orathai Pongruktham . (2019). Mangrove Cover, Biodiversity, and Carbon Storage of Mangrove Forests in Thailand

[29] Global Mangrove Alliance. (2021). The State of the Worlds Mangroves

6. National Strategy that relates to the environment and climate change

Thailand has several key environmental objectives, particularly concerning climate change. These objectives are articulated through various national strategies, plans, and international commitments under the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement.

Nationally Determined Contributions (NDCs): Thailand communicates its climate efforts through its NDCs under the Paris Agreement. The current NDCs include the following targets:

- **2030 Greenhouse Gas (GHG) Emissions Reduction Goals:** The Second Updated NDC, submitted in 2022, aims to reduce GHG emissions by 30% from the projected business-as-usual (BAU) level by 2030 through domestic efforts (unconditional target). This target can be increased up to 40% from BAU by 2030 (conditional target), contingent on adequate and enhanced access to technology development and transfer, financial resources, and capacity-building support.
- **2035 GHG Emission Reduction Goals:** Thailand is currently preparing its NDC 3.0, with a target year of 2035. This next version will transition from a BAU-based target to an Absolute emission target, based on emissions from a 2019 baseline. The target period for NDC 3.0 is 2031-2035, and it is scheduled for submission to the UNFCCC Secretariat by 2025.
- **Long-Term GHG Emissions Reduction Goals:** Thailand is committed to achieving Carbon Neutrality by 2050 and Net-Zero GHG Emissions by 2065. These ambitious targets were announced at COP26.
- **Climate Adaptation:** The country's second updated NDC in 2022 also states that "in addition to its mitigation efforts, Thailand has treated adaptation as equally important".

Long-Term Low Greenhouse Gas Emission Development Strategy (LT-LEDS)[30]**:** Thailand has a revised LT-LEDS (November 2022) that serves as a long-term framework to guide the country towards low GHG emissions and climate-resilient development, aligning with the Carbon Neutrality and Net-Zero goals. It identifies key measures and guidelines across energy, transport, IPPU, waste, agriculture, and Land Use, Land-Use Change, and Forestry (LULUCF) sectors.

The NDC targets are being implemented through the **NDC Action Plan on Mitigation 2021–2030**[31]. The action plan serves as a key milestone for achieving Thailand's GHG emission reduction targets by 2030. It aims to operationalize the targets set in the NDC, covering the economy-wide sectors excluding LULUCF for the period 2021–2030. The overall unconditional mitigation target from the Action Plan is 184.8 MtCO2eq, representing 33.3% reduction from the BAU 2030 level of 555 $MtCO_2eq$. An additional 37.5 $MtCO_2eq$ (or 6.7%) reduction is targeted under the conditional goal, bringing the potential total reduction to 222.3 $MtCO_2eq$, or 40%. The plan sets specific mitigation targets for the period 2021–2030 for five key sectors based on the BAU and 2030 projection of 555 $MtCO_2eq$:

1. **Energy:** Targets an unconditional reduction of 124.6 $MtCO_2eq$ (22.5%) and a conditional reduction of 32.0 $MtCO_2eq$ (5.8%). Measures include energy conservation and increasing energy efficiency in power plants, equipment, and various sub-sectors (manufacturing, residential, commercial), increasing renewable energy utilization such as solar and wind power, promoting electric vehicles (EVs), developing alternative fuels like hydrogen and Sustainable Aviation Fuel (SAF), and exploring technologies like Carbon Capture and Storage (CCS) or Usage (CCUS).
2. **Transport:** Targets an unconditional reduction of 45.6 $MtCO_2eq$ (8.2%) and a conditional reduction of 2.50 $MtCO_2eq$ (0.4%). Key actions involve supporting the use of electric vehicles (including locomotives and boats, along with infrastructure), improving energy efficiency through standards and tax incentives, enhancing urban mobility via public transportation and traffic management, improving inter-urban

[30] UNFCCC, Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment. (2022). Mid-century, Long-term Low Greenhouse Gas Emission Development Strategy: Thailand

[31] Department of Climate Change and Environment. *NDC Action Plan on Mitigation 2021–2030*. Bangkok: Ministry of Natural Resources and Environment, November 2023. https://www.dcce.go.th/3317/

transport and green logistics through rail and water transportation, and supporting alternative future energy like hydrogen and Sustainable Aviation Fuel (SAF).

3. **Agriculture:** Targets an unconditional reduction of 4.1 $MtCO_2eq$ (0.7%) and a conditional reduction of 1.0 $MtCO_2eq$ (0.18%). Measures address reducing the use of chemical fertilizers, implementing alternate wet and dry rice cultivation practices to reduce methane emissions, and generally promoting better manure and agriculture waste management, efficient water use, smart farming, organic fertilizers, and energy efficiency in agricultural activities
4. **Waste Management and Industrial Wastewater:** Targets an unconditional reduction of 9.1 $MtCO_2eq$ (1.6%) and a conditional reduction of 1.9 $MtCO_2eq$ (0.3%). Actions cover managing community waste through various methods including burning landfill gas, waste-to-energy, semi-aerobic landfill, composting, anaerobic digestion, and mechanical biological treatment, managing community and industrial wastewater (including increasing biogas production and reusing methane gas), and promoting waste reduction (like food waste and plastics)
5. **Industrial Processes and Product Use (IPPU):** Targets an unconditional reduction of 1.4 $MtCO_2eq$ (0.3%) and a conditional reduction of 0.1 $MtCO_2eq$ (0.02%). Measures focus on replacing clinker in cement production with alternative materials and replacing or changing refrigerants, potentially complemented by reducing nitrous oxide emissions from specific industries and applying CCS/CCUS technologies.

The **Climate Change Master Plan (CCMP) (2015-2050)** is a comprehensive national framework for climate change management in Thailand. Its primary goal is to provide a long-term direction and key strategies for driving Thailand towards a low carbon emission and climate-resilient society. The CCMP indicates three key strategies that translate into climate objectives:

- **Climate Change Adaptation**, which aims to build climate resilience by integrating adaptation and resilience objectives into policies and measures in all sectors
- **Mitigation and Low Carbon Development**, which facilitates the development of mechanisms for GHG emissions reduction and leads to sustainable low carbon growth, and

- **Enabling Environment for Climate Change Management,** which seeks to build capacity around climate change by raising the awareness of relevant stakeholders as well as developing information-based tools and technologies to support climate change adaptation and mitigation

Thailand's National Strategy (2018-2037) [32] is a foundational policy framework that integrates climate change management into the country's long-term development vision. It serves as a high-level framework that requires climate change issues to be integrated alongside other economic and social considerations to ensure long-term continuity. It is a key document that underpins Thailand's efforts towards achieving carbon neutrality by 2050 and net zero emissions by 2065. It also serves as a key policy document guiding the development of other critical climate plans, including the National Adaptation Plan (NAP) and the Long-Term Low Greenhouse Gas Emission Development Strategy (LT-LEDS).

The National Strategy puts forward the following environment-related goals:

1. Promoting green growth and sustainable development
2. Conserving and rehabilitating biological diversity
3. Conserving and restoring rivers, canals, and other natural water sources
4. Maintaining and expanding eco-friendly green areas
5. Promoting sustainable consumption and production
6. Promoting sustainable maritime-based economic growth
7. Increasing value of a maritime bioeconomy
8. Improving, rehabilitating, and developing the entire marine and coastal resource ecosystem
9. Rehabilitating tourist beaches, protecting and improving the entire coastal resource ecosystem, and setting out an integrated coastal management policy
10. Developing and increasing eco-friendly marine activities
11. Promoting sustainable, climate-friendly based society growth
12. Mitigating greenhouse gas emissions
13. Adapting to prevent and reduce losses and damages caused by natural disasters and impacts of climate change

[32] Office of the National Economic and Social Development Council. National Strategy

14. Focusing on investment in public and private sectors' climate-friendly infrastructure development
15. Developing preparedness and response systems for emerging and remerging infectious diseases caused by climate change
16. Developing urban, rural, agricultural, and industrial areas with a critical focus on a sustainable growth
17. Establishing ecological landscape plans to promote urban, rural, agricultural, industrial, and conservation area development on an integrated basis in harmony with area capacity and suitability
18. Developing urban, rural as well as agricultural and industrial areas in line with the ecological landscape plans
19. Eliminating pollution and damaging agricultural chemicals in line with international standard
20. Sustainably conserving, rehabilitating, and developing natural resources, architectural heritage, art, and culture, as well as local identity and lifestyles
21. Developing networks of urban and community development institutions and volunteers through a mechanism of local sectors' involvement and participation
22. Strengthening public health and environmental health systems as well as enhancing capacity needed to address preventive and controlling measures of emerging and re-emerging infectious diseases
23. Creating eco-friendly water, energy, and agricultural security
24. Developing the entire river basin management system to ensure national water security
25. Enhancing the productivity of an entire water system to promote water-use efficiency and generate value added for water consumption adequate with international standard
26. Creating national energy security and promoting eco-friendly energy usage
27. Enhancing energy efficiency through energy intensity reduction
28. Developing agricultural and food security in terms of quantity, quality, pricing, and access at both national and community levels
29. Improving the paradigm for determining the country's future by promoting a sense of environmental stewardship among Thai people
30. Promoting desirable environmentally friendly characteristics and behaviours among Thai people that positively contribute to the environment and quality of life of Thai people

31. Developing tools, justice mechanisms, and systems, environmental democracy on efficient natural resources, and environment management
32. Establishing institutional structures to manage significant issues concerning natural resources and environmental management
33. Initiating projects that can improve a development paradigm to determine the country's future in terms of natural resource, environmental, and cultural sustainability based on public participation and good governance

7. Vital national policies related to GHG reduction

Thailand has progressively strengthened its climate commitments through its NDC, first submitted in 2016 and most recently updated in November 2022. Under the latest NDC, Thailand pledges to reduce greenhouse gas (GHG) emissions by 30% from projected business-as-usual levels by 2030, using 2005 as the baseline year.[33] This contribution could be increased up to 40% subject to adequate and enhanced access to technology development and transfer, financial resources and capacity building support.

Thailand has implemented the NDC Roadmap on Mitigation 2021–2030 and the NDC Action Plan. Additionally, the country submitted an updated LT-LEDS[34] in 2022, aligning its goals with achieving carbon neutrality by 2050 and net zero emissions by 2065. This revised LT-LEDS lays out climate policies, priorities, and measures that will navigate Thailand towards low GHG emissions and climate-resilient development. Furthermore, this version outlines key climate policies and sectoral strategies, particularly emphasizing the energy sector and the adoption of carbon capture, utilization, and storage (CCUS) technologies.[35]

Thailand climate change mitigation strategies

Like other ASEAN countries, Thailand must engage in ambitious climate change mitigation actions commensurate with the scale of the climate threats facing the country and the region.

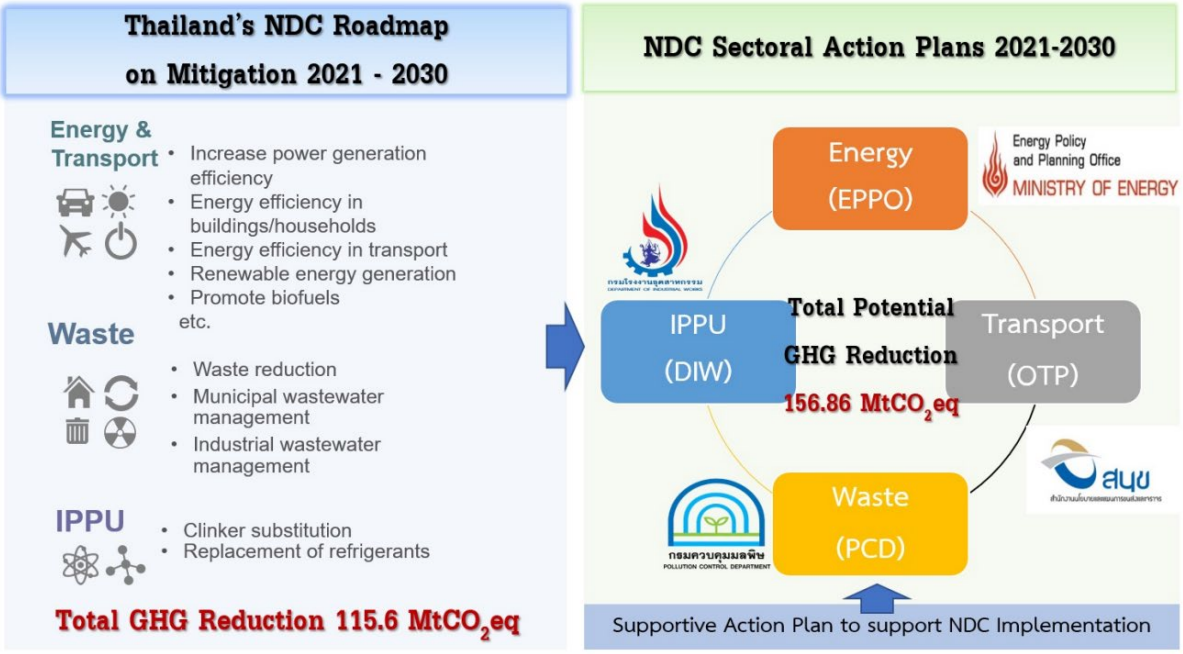
[33] UNFCCC, Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment. (2022). Thailand First NDC (Updated submission)

[34] UNFCCC, Thailand Long-Term Low Greenhouse Gas Emission Development Strategy, 2022, https://unfccc.int/sites/default/files/resource/Thailand%20LT-LEDS%20%28Revised%20Version%29_08Nov2022.pdf

[35] Thammasat University. (2020). The revision and update of Thailand's Long-Term Low Greenhouse Gas Emission Development Strategy (LT-LEDS) and Thailand's National Determined Contribution (NDC)

To accelerate the decarbonisation of its economy, Thailand has identified a set of mitigation actions in the energy, transportation, IPPU and waste management sectors.

Figure 4 GHG emission reduction measures under Thailand's Nationally Determined Contribution (NDC) Action plan (2021-2030)



Source: ONEP. 2022. BUR4

Given Thailand's emission profile, the energy transition will play a predominant role in Thailand's journey towards a net-zero economy in line with the Paris Agreement targets. While Thailand's overall GHG emissions represent less than 1% of global emissions and are lower than the world average, the country's key challenge in decarbonisation comes from its heavy reliance on fossil fuels to meet energy demand.

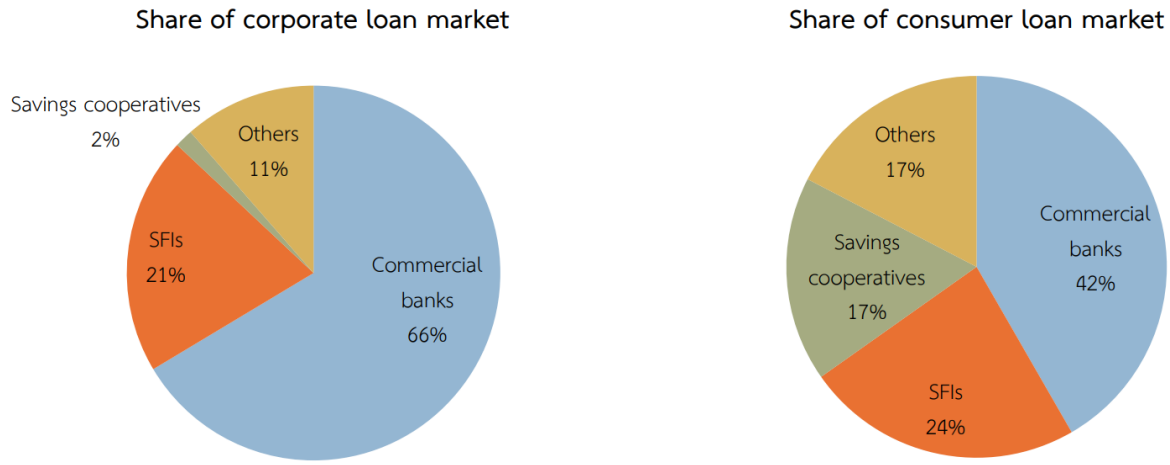
This needs to be coupled with grid modernization and micro-grid development to support distributed energy resources, deregulation of the electricity market to accommodate an increasing share of prosumers and digitalization of the renewable energy control centre platform for both on-grid and off-grid areas. In addition, the provision of incentives to support renewable energy investment and markets, renewable energy technology development, including bio-economy research and development of hydrogen and bio-jet, further

enhancement of energy efficiency improvement in all relevant sectors, as well as promotion of electric vehicles, will be important[36].

8. State of the local green finance market

Considering Thailand's financing system structure reveals that loan market has been a major source of financing as evident from data on financing categorized by type of funding. In 2024, private sector loans[37] represents the largest component, accounting 1.7 times the GDP, where loans were mostly extended by commercial banks (Figure 5). This is followed by financing via stock and bond markets with the combined value of stock and bond markets, accounting 0.9 times the GDP.[38]

Figure 5 Thailand's financing system structure (in percent of total financial assets)



Source: Bank of Thailand, Financial Stability Review, 2024

In recent years, financial sector has played a vital role in mobilizing funding to help businesses adapt and respond to climate change in a timely manner. Thailand's sustainable finance market has continued to grow, supported by enabling financial policies and regulations. These efforts have helped direct capital flows from the financial system into the real economy to support sustainable development. Between 2016 and 2022, Thailand ranked the second in

[36] UNFCCC, "Thailand's Long-term Low Greenhouse Gas Emission Development Strategy (Revised Version)," November, 2022, https://unfccc.int/sites/default/files/resource/Thailand%20LT-LEDS%20%28Revised%20Version%29_08Nov2022.pdf

[37] Loans to the private sector include loans granted to households, non-profit financial institutions and non-financial corporations

[38] Bank of Thailand (2024). Financial Stability Review 2024

ASEAN—after Singapore[39]—in issuing green, social, and sustainability (GSS) debts[40]. In 2023, Thai businesses issued around 882 billion baht in ESG bonds, accounting for 5% of the total outstanding in the Thai bond market[41]. Meanwhile, large commercial banks in Thailand extended approximately 190 billion baht in green and sustainability loans, representing 1.4% of the total outstanding loans in the banking system[42]. However, given Thailand's current economic context—characterized by a high dependence on coal and oil for energy, along with its vulnerability to climate change—the country still requires substantial investment to effectively respond to the increasing frequency and severity of climate-related events. According to estimates by the International Energy Agency (IEA), developing countries and emerging economies will need to invest an average of USD 2.8 trillion per year over the next decade, or approximately 90.2 trillion baht, in energy transition efforts. These include the adoption of renewable energy and improvements in energy efficiency. Such demand represents a fourfold increase compared to current investment levels and is essential for meeting the Paris Agreement goal[43].

Since 2018, the Securities and Exchange Commission has implemented measures such as waiving application and filing fees for the issuance of sustainability-related debt instruments, including green bonds, social bonds, sustainability bonds, and sustainability-linked bonds, to further encourage sustainable financing.[44] As of 2025, the scope of these incentives has been

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[39] Miguel Almeida, Chi Xiang Wong. Climate Bonds Initiative. (2023). ASEAN Sustainable Finance State of the Market 2022

[40] Green debts include bonds, loans, and social and sustainability debts/bonds.

[41] Bank of Thailand. (2024). *Calculated by the Bank of Thailand based on Thai BMA data, covering green, social, sustainability, and sustainability-linked bonds.*

[42] Numnonda, R. (2024). *Keynote speech at the seminar "Unlock ESG Value for Business Success"*. Talking points, delivered by Mr. Ronadol Numnonda, former Deputy Governor for Financial Institutions Stability, Bank of Thailand. Talking point งานสัมมนา Unlock ESG Value for Business Success

[43] International Energy Agency (IEA). (2023). Scaling up Private Finance for Clean Energy in Emerging and Developing Economies

[44] Securities and Exchange Commission, Thailand. (2022, May 19). *SEC extends waiver of application and filing fees for sustainable debt instruments to promote sustainable finance* [Press Release No. 79/2565]. Retrieved from https://www.sec.or.th/TH/Pages/News_Detail.aspx?SECID=9434

expanded to also cover debt instruments that are aligned with the ASEAN and Thailand Taxonomy.[45]

In addition, Thailand has a large number of small and medium-sized enterprises (SMEs) that may face indirect pressure from larger companies being driven to transition due to both domestic and international environmental policies. These SMEs require support in terms of both technological knowledge and financial resources. To facilitate a smooth and timely environmental transition, the public sector and financial regulators have introduced various support measures for businesses—particularly SMEs. For instance, in 2024, the Bank of Thailand, in collaboration with eight commercial banks, launched the pilot program "Financing the Transition."[46] The initiative aims to promote the development of financial products that enable businesses to transition from "brown" (environmentally unfriendly) toward "less brown" practices (more environmentally friendly) in a practical and scalable manner. The program sets an initial loan target of 100 billion baht by 2025.

With regard to acceleration of the sustainable development, the Working Group on Sustainable Finance (WG-SF), consisting of the Fiscal Policy Office, the Bank of Thailand, the Securities and Exchange Commission, the Office of Insurance Commission, and the Stock Exchange of Thailand, has jointly published Sustainable Finance Initiatives for Thailand[47]. Subsequently, the development of the Thailand Taxonomy was initiated, with a focus on six high-emitting sectors.[48] As a key component of the sustainable finance ecosystem, the Thailand Taxonomy can play instrumental roles in achieving this vision. In particular, the Thailand Taxonomy will:

- Establish a common language among Thai financial institutions about the classification of green finance, thus facilitating the creation of green finance standards within the financial sector;

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[45] Securities and Exchange Commission, Thailand. (2025, May 26). *Incentives for securities and debt offerings*. Retrieved from https://www.sec.or.th/TH/Pages/LAWANDREGULATIONS/RESOURCECENTER-INCENTIVE.aspx

[46] Bank of Thailand. (2024). Financing the Transition: การเงินเพื่อการปรับตัวสู่ความยั่งยืนของภาคธุรกิจ

[47] Bank of Thailand. (2021). Joint Statement Sustainable Finance Initiatives for Thailand

[48] The six sectors include energy, transportation, manufacturing, construction and real estate, agriculture, and waste management.

- Support better-informed and more efficient decision-making by financial institutions to respond to investment opportunities that contribute to achieving green and sustainable development objectives;
- Inform the development of new products and services such as green bonds, loans, and index-linked capital market investment products;
- Form the basis for the government to design incentive measures to further promote green finance;
- Create a stronger awareness of green and sustainable economic activities among different stakeholders, which can further stimulate demand and supply for green and sustainable financial products.

The Thailand Taxonomy has been designed to ensure interoperability with other national taxonomies. This alignment helps elevate Thailand's green financial products to international standards and is expected to facilitate greater inflows of green and sustainable finance from global markets in the future.