

THAILAND: TAXONOMY

Thailand Background

May 2025

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 1990¹. 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 hazards²

	Temperature-related	Wind-related	Water-related	Solid mass-related
<i>Chronic</i>	<ul style="list-style-type: none"> ● Changing temperature (air, freshwater, marine water) ● Heat stress ● Temperature variability ● Permafrost thawing 	Changing wind patterns	<ul style="list-style-type: none"> ● Changing precipitation patterns and types (rain, hail, snow/ice) ● Precipitation or hydrological variability ● Ocean acidification ● Saline intrusion ● Sea level rise ● Water stress 	<ul style="list-style-type: none"> ● 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
<i>Acute</i>	<ul style="list-style-type: none"> ● Heat wave ● Cold wave/frost ● Wildfire 	<ul style="list-style-type: none"> ● Cyclone, hurricane, typhoon ● Storm (including blizzards, dust and sandstorms) ● Tornado 	<ul style="list-style-type: none"> ● Drought ● Heavy precipitation (rain, hail, snow/ice) ● Flood (coastal, fluvial, pluvial, ground water) ● Glacial lake outburst 	<ul style="list-style-type: none"> ● 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 impacts⁴, 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 2070–2100⁷.

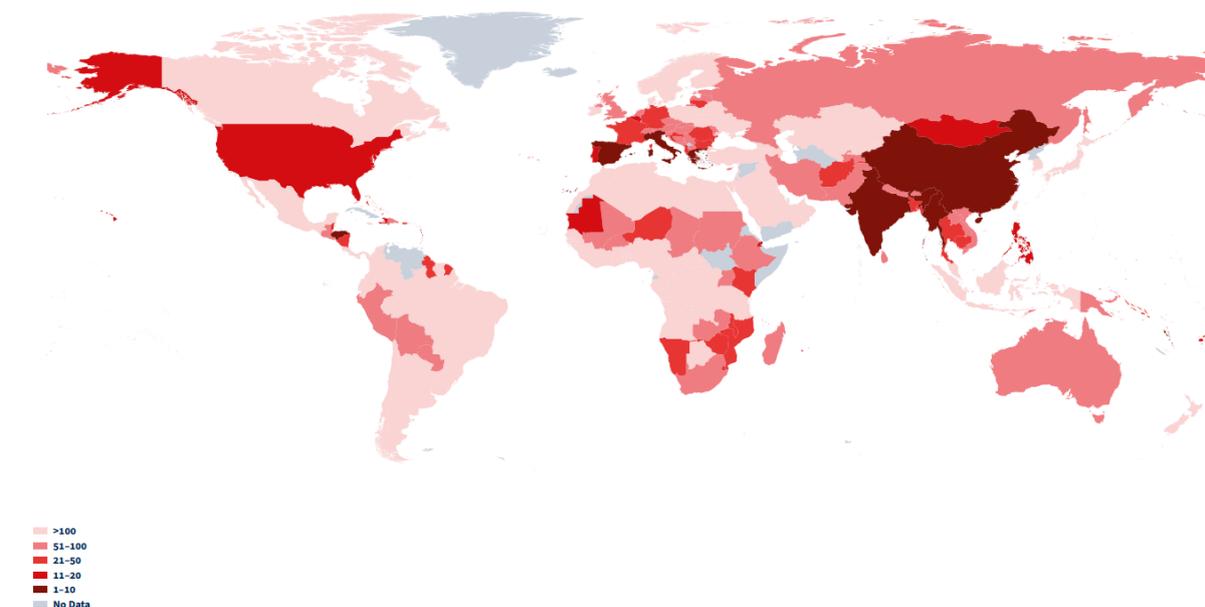
⁴ World Bank, Asian Development Bank. (2021). [Climate Risk Country Profile Thailand](#)

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 erosion⁸. 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). The coronavirus disease (COVID-19)

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](#)

pandemic crisis severely impacted the country, given its high dependence on trade and tourism.

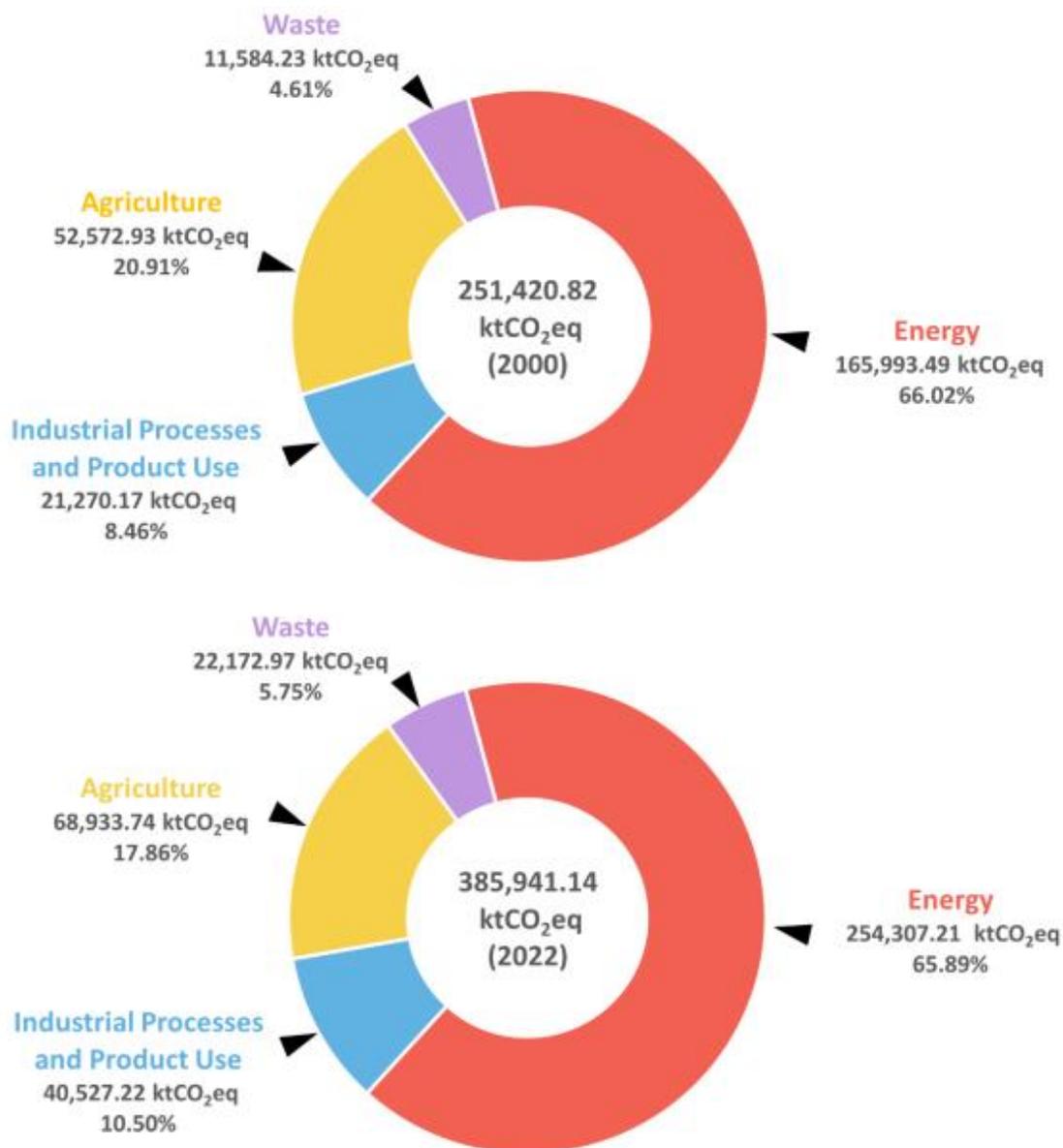
According to the World Bank, the economy expanded by 1.6% in 2021 amid four waves of the pandemic and is not expected to recover to pre-COVID-19 levels until 2023⁹. Thailand is addressing the twin challenges of accelerating post-COVID-19 recovery and making climate-resilient and low-carbon development a key pillar of long-term sustainable economic 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 Thailand's Fourth National Communication (NC4) report, between 2000-2018, the main source of GHG emissions in Thailand was the energy sector, which saw an increase of 55.88% from 165,092 GgCO₂eq in 2000 to 257,341 GgCO₂eq in 2018.

In 2018, total GHG emissions (excluding those from the Land Use and the Land-Use Change and Forestry (LULUCF) sector) were 372,649 GgCO₂eq and net GHG emissions were 286,680 GgCO₂eq (including those from LULUCF, which contributes to a net removal of 85,968 GgCO₂eq. in 2018¹⁰). The energy sector remains the most significant contributor to Thailand's GHG emissions in 2018, accounting for 69% of the total GHG emissions, making it the most important sector for Thailand's climate change mitigation actions. The share of emissions from the Agriculture, IPPU, and Waste sectors in 2018 were 16%, 11%, and 4%, respectively.

⁹ World Bank. [Thailand](#)

¹⁰ UNFCCC, Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment. (2022). [Thailand's Fourth National Communication](#)

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



Source: Thailand's First Biennial Transparency Report

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.¹¹ 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

¹¹ World Bank, Asian Development Bank. (2021). [Climate Risk Country Profile Thailand](#)

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.¹²

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.¹³ 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 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.

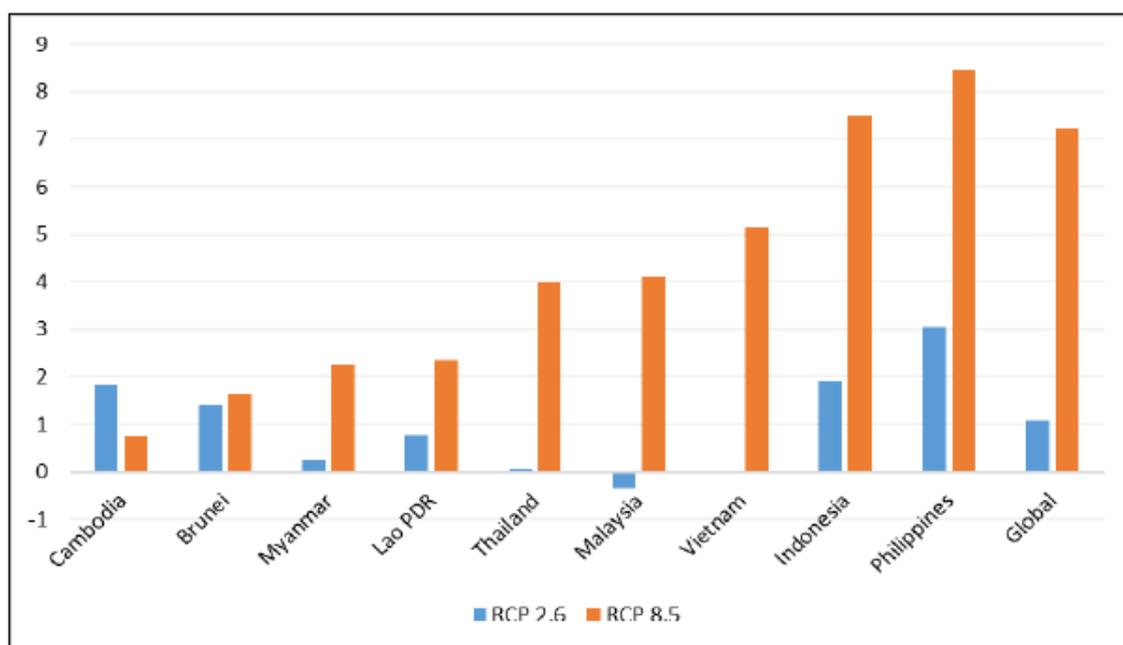
¹² World Bank. (2012). [Thai Flood 2011 : Rapid Assessment for Resilient Recovery and Reconstruction Planning](#)

¹³ UNDP, Fiscal Policy Research Institute. (2022). Final Report: Conducting a Country Diagnostic on Inclusive Insurance and Risk Finance for Thailand

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.¹⁴

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 160,000 additional jobs by 2030, representing approximately 0.3% of total employment.¹⁵ 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.¹⁶ 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.

¹⁴ Thammasart 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).

¹⁵ World Bank. (2022). Thailand Economic Monitor June 2022: Building Back Greener: The Circular Economy

¹⁶ KPMG. (2021). [Net Zero Readiness Index 2021](#)

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.
- 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.¹⁷

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.¹⁸
- 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.¹⁹

¹⁷ Pollution Control Department, Ministry of Natural Resources and Environment. (2021). [Thailand State of Pollution 2020 \(B.E. 2563\) \(Volume 26, 5 March 2021 \(B.E. 2564\)\)](#)

¹⁸ All Around Plastics. (2021). [Exploring the Perspective: “Environmental Problems are Problems for Everyone” with Dr. Wijarn Simachaya, President of the Thailand Environment Institute](#)

¹⁹ UCN. (2020). [Thailand](#)

- 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.²⁰
- 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 Plastic Waste Management 2018–2030 with an ambition to recycle all plastic waste by 2027.²¹

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.²²
- 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 km² in 2006 to 116304 km², equivalent to 23 % of the total land area, including 22 national parks extending across 6,416 km².

²⁰ Pollution Control Department, Ministry of Natural Resources and Environment. (2021). [Thailand State of Pollution 2020 \(B.E. 2563\) \(Volume 26, 5 March 2021 \(B.E. 2564\)\)](#)

²¹ Pollution Control Department, Ministry of Natural Resources and Environment. (2021). [Thailand Roadmap on Plastic Waste Management 2018–2030](#)

²² UNFCCC, Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment. (2022). [Thailand's Fourth National Communication](#)

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.²³
- In 2018, 30% of the coastlines were at critical levels of erosion, with more than 5 meters of erosion per year.²⁴ Land subsidence, land use change from aquaculture and residential expansion, and mass tourism are all driving coastal erosion in Thailand. 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 1998.²⁵
- During 2002–2012, the rate of mangrove loss was significantly slower in Thailand²⁶ 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.²⁷
- 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.²⁸

²³ UNDP. (2021). The Biodiversity Finance Plan – The Biodiversity Finance Initiative (BIOFIN) – Thailand

²⁴ Nation Thailand. (2018). [Experts Contradict Govt on Coastal Erosion](#)

²⁵ Global Mangrove Alliance. (2018). [Pakistan-Thailand-Vietnam](#)

²⁶ Richards and Friess. (2016). [Rates and drivers of mangrove deforestation in Southeast Asia, 2000–2012](#)

²⁷ Poonsri Wanthongchai, Orathai Pongruktham . (2019). [Mangrove Cover, Biodiversity, and Carbon Storage of Mangrove Forests in Thailand](#)

²⁸ Global Mangrove Alliance. (2021). [The State of the Worlds Mangroves](#)

- 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.

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

Thailand’s National Strategy (2018-2037)²⁹ 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
14. Focusing on investment in public and private sectors’ climate-friendly infrastructure development
15. Developing preparedness and response systems for emerging and reemerging infectious diseases caused by climate change

²⁹ Office of the National Economic and Social Development Council. [National Strategy](#)

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.³⁰ 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 Long-Term Low Greenhouse Gas Emission Development Strategy (LT-LEDS)³¹ in 2022, aligning its goals with achieving carbon neutrality by 2050 and net zero emissions by 2065. The LT-LEDS outlines key climate policies and sectoral strategies, particularly emphasizing the energy sector and the adoption of carbon capture, utilization, and storage (CCUS) technologies.³²

Thailand climate change mitigation strategies

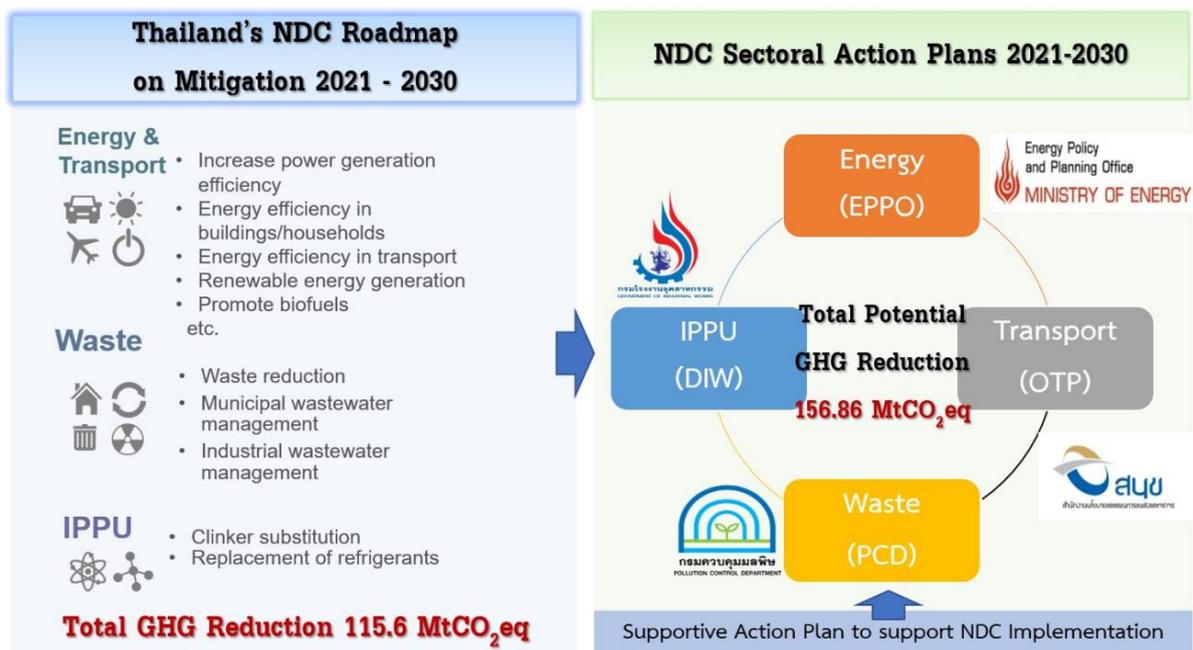
Like other ASEAN countries, Thailand must engage in ambitious climate change mitigation actions commensurate with the scale of the climate threats facing the country and the region. To accelerate the decarbonisation of its economy, Thailand has identified a set of mitigation actions in the energy, transportation, IPPU and waste management sectors.

³⁰ UNFCCC, Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment. (2022). [Thailand First NDC \(Updated submission\)](#)

³¹ 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

³² Thammasart 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)

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 important³³.

³³ 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