



EAST ASIA
PACIFIC

Thailand

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

6 Mobilizing finance for adaptation and transition

This chapter sets out how the investments prioritized in this CCDR can be financed. It begins by consolidating the overall financing needs for the recommended adaptation and mitigation investments. It assesses which of these investments will require public financing, and which investments could be financed partially or entirely by the private sector. It then analyzes the ability of the government to meet the associated public investment needs while maintaining overall fiscal sustainability, taking into account potential revenues from carbon pricing.

With limited public resources, this chapter also reviews the potential for private sector financing of climate mitigation and adaptation efforts. The private sector has an important role to play in investing in clean energy, green manufacturing, and climate-smart agriculture. But bottlenecks include inadequate data infrastructure, unclear incentives for issuers and investors, and limited awareness and capacity to prepare green and sustainable projects. Until recently, clear, consistent, and globally accepted definitions on sustainability activities had also been lacking, which affected the quality of reporting and disclosures. The recent introduction of a taxonomy can help address these challenges, but will require rigorous implementation and capacity building across sectors.

6.1 Investment needs for adaptation and mitigation

This CCDR estimates that the additional investment needed to respond to climate change in Thailand is USD219 billion in discounted (NPV) terms over the next 25 years. This is equivalent to 2.4 percent of cumulative GDP over this period. It includes USD 105 billion for climate adaptation, USD 96 billion for mitigation, and USD 19 billion for investments in climate smart agriculture and forests, which have both adaptation and mitigation benefits (**Error! Reference source not found.**). This is the total incremental investment needed for key adaptation measures prioritized in this report and to achieve carbon neutrality by 2050, relative to a BAU scenario of no additional action or investment. It excludes O&M savings, most of which would accrue to the private sector. These estimates should be interpreted with caution, due to uncertainty about the future evolution of technologies, costs, climate, and other parameters.

Table 6.1: Additional climate investment needs (2025-2050), USD million

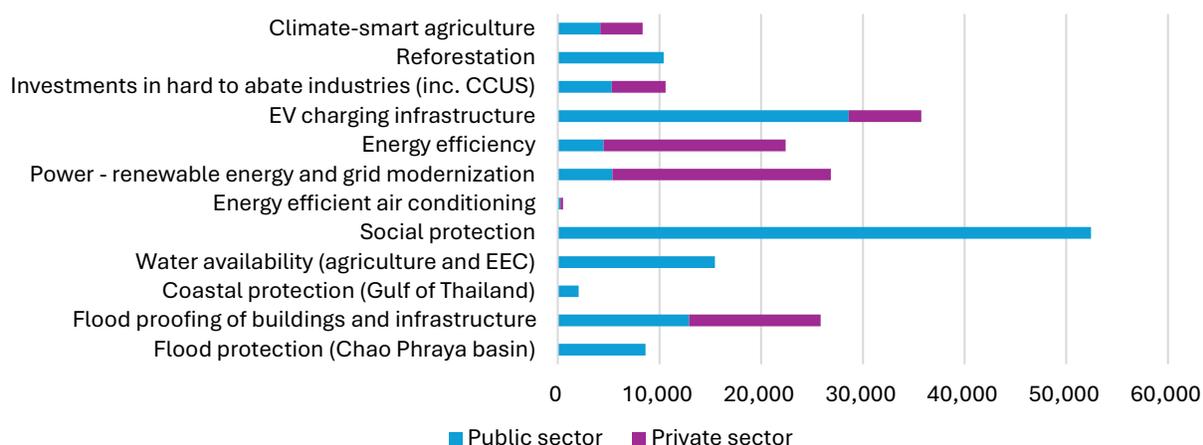
	Undiscounted, nominal			Total	Net present value @ 6%	As % of GDP
	2025-30	2031-40	2041-50			
Adaptation						
Flood protection (Chao Phraya basin)	4,700	9,400	0	14,100	8,613	0.09
Flood proofing of buildings and infrastructure	11,950	23,900	11,950	47,800	25,861	0.28
Coastal protection (Gulf of Thailand)	1,892	781	173	2,846	2,058	0.02
Water availability (agriculture and EEC)	7,265	12,092	10,955	30,311	15,451	0.15
Social protection	17,805	43,784	55,369	116,958	52,418	0.57
Energy efficient air conditioning	240	400	400	1,040	520	0.01
Total adaptation	48,390	98,784	87,274	234,449	115,427	1.1
Mitigation						
Power – renewable energy and grid modernization	32,718	6,501	(15,030)	24,189	26,864	0.29
Energy efficiency	7,127	18,332	25,952	51,411	22,394	0.24
EV charging infrastructure	26,718	20,745	10,377	57,840	35,755	0.39
Investment in hard-to-abate industries (inc. CCUS)	2,228	7,425	17,325	26,978	10,594	0.11
Total mitigation	68,791	53,002	38,625	160,418	95,607	1.0
Agriculture and forests						
Reforestation	7,500	7,500	0	15,000	10,415	0.11
Climate-smart agriculture	3,455	6,589	7,412	17,455	8,355	0.09
Total agriculture and forests	10,955	14,089	7,412	32,455	18,770	0.2
Total investment needs	123,597	157,448	124,884	405,928	219,298	2.4

Source: World Bank analysis.

Notes: These investment estimates are largely based on the results of bottom-up sectoral analysis, though in some instances (e.g. irrigation, climate-smart agriculture) the estimates rely more on cross-country experience/data and international benchmarks. “% of GDP” figures are calculated by dividing the NPV of recommended investments by the NPV of projected future GDP.

The bulk of adaptation spending is expected to be done by the public sector, while the private sector will take on more than half the investments in mitigation (Figure 6.1). In the energy sector, for example, clean energy investments are expected to be made primarily by private producers, benefiting from reform to open up the power market and establish a carbon price signal, as well as public investments in grid modernization. In the transport sector, the shift to e-mobility and biofuels is expected to be financed primarily by individual vehicle owners and EV companies. On the other hand, when it comes to adaptation, the public sector will be primarily responsible for spending on adaptive social protection, flood prevention, and water security, given the public goods aspects of many of the required interventions. Indeed when it comes to addressing flooding in the Chao Phraya basin, the proposed “Nine Plans” (which would be publicly financed) are effective in reducing the potential impact of flooding and will reduce the costs needed to flood-proof individual buildings and structures (the burden of which would likely fall more on the private sector). The additional public spending on adaptation would average around 1 percent of GDP per year over the next 25 years, equivalent to around USD 7.5 billion per year, a substantial addition to the estimated 117-137 billion THB (3.4-4 billion USD) currently being spent on the climate agenda annually.¹ At present, the scale of the budget for adaptation and mitigation needs in Thailand can only be inferred through proxies such as budgets allocated to climate change and environmental objectives, underscoring the need for more comprehensive climate budget tagging.²

Figure 6.1: Climate investment needs by sector, NPV (USD million)



Source: World Bank analysis.

6.2 Financing climate-related public spending needs

The introduction of carbon pricing instruments has the potential to generate significant public revenues for Thailand. In line with NDC targets, we assume that a carbon price is phased in between 2026 and 2030, and reaches a target value of USD 25 per tCO₂e in 2030. Beyond 2030, the price

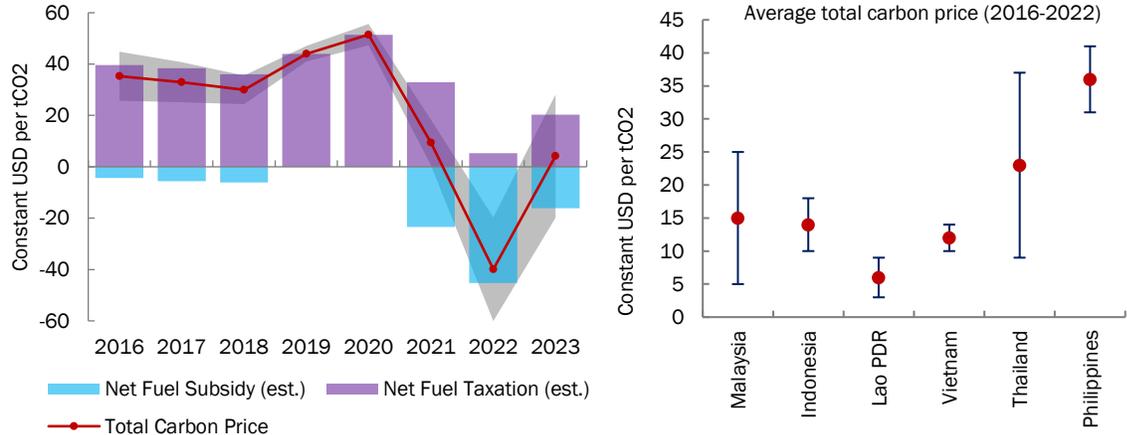
¹ According to the Thailand’s Budgetary Appropriation Act, in 2025 the government has allocated 136,851 million THB (about USD 4 billion) of budget under the Strategy for Eco-Friendly Development and Growth. This number has been increasing continuously since 2021 at around 4.2 percent per year.

² The actual public budget allocation for climate change objectives could be higher as some projects are partially relevant to the green sustainability agenda but are not included under climate-related strategies. Climate budget tagging in the Government Fiscal Management Information System (GFMS) could help ensure that climate-related expenditures are tracked and adaptation and mitigation contributions identified.

grows steadily by 2.25 percent per year to provide a price signal that incentivizes ongoing emissions reductions.³ Under this trajectory, carbon price revenues are projected to reach close to 1 percent of GDP in 2030, remaining at this level through most of the projection period as the price rises while emissions decline.

Such a pathway for carbon pricing would restore and then build upon the effective ‘total carbon price’ that was in place in Thailand prior to the pandemic, during which time substantial fuel excises were in place. In the aftermath of the pandemic, excise taxes on fuel were cut and subsidies on natural gas and electricity were introduced to provide cost of living relief (Figure 6.2).

Figure 6.2: Total carbon price in Thailand and peer countries



Carbon taxes will impose a regressive burden on households in the short term, but these effects can be mitigated through compensatory transfers. Carbon taxes impact households through multiple channels. Firstly, they directly increase the cost of energy and energy-intensive services like transportation, reducing real incomes. This effect is pronounced if households have limited access to cleaner, cheaper fuel alternatives. Secondly, there is an indirect impact via the labor market. Job opportunities in carbon-intensive sectors would diminish, while new opportunities may emerge in greener sectors as investments rise. Current analysis indicates that the price and real income effects of carbon taxes are negative and regressive, disproportionately affecting poorer households. In contrast, labor market effects are positive and more evenly distributed across income levels. Taking all effects into account, the poorest decile could face a decline of almost 20 percent in real welfare compared to a business-as-usual scenario (Figure 6.3).

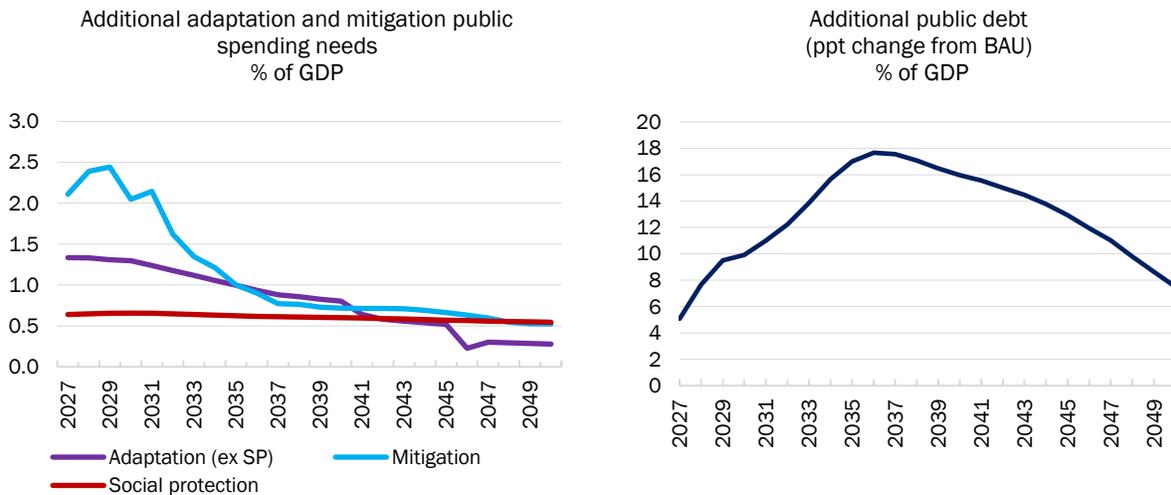
Figure 6.3: Distributional impacts of carbon taxes on household incomes by decile

³ 2.25 percent is the annual growth rate for the social cost of carbon recommended by the World Bank.



On the other hand, the revenue generated by carbon taxes will help to finance mitigation and adaptation investments, as well as increased social protection spending, each of which would help to offset these welfare losses. These expenditure needs are largest over the next decade, and then – with the exception of social protection spending – taper over time (Figure 6.4). After accounting for the impact of additional carbon price revenues, the marginal impact on public debt (relative to the BAU scenario) is projected to peak in 2036 before declining due to the decline in additional spending and the increase in GDP (around 4 percent higher than in the BAU case) associated with making the recommended adaptation and mitigation investments.⁴

Figure 6.4: Climate spending and impact on public debt



Additional tax and social protection reforms would further mitigate fiscal risks associated with climate-related investments, while improving the welfare of the poorest. Previous work has shown progressive reforms to Value Added Tax (VAT), personal income tax, and property taxes could together increase revenues by 3.5 percentage points of GDP. Other things remaining equal, these reforms would be more than sufficient to finance the additional climate spending needs highlighted in this CCDR and avoid the need for additional public debt over the longer term (though Thailand will also face pressures to

⁴ The 4 percent increase in GDP by 2050 relative to BAU is based on a scenario (in MFMod) in which the adaptation investments recommended in Chapter 3 are made, as well as the mitigation investments and reforms (including carbon pricing) associated with the Accelerated Decarbonization scenario in Chapter 4. The cost of the recommended public adaptation and mitigation spending is quantified in Table 6.1 and Figure 6.1. Carbon revenues are used to meet these additional public spending needs with debt financing any residual climate-related public spending.

increase public spending in other areas over the same period).⁵ This work also showed that a combination of VAT and social assistance reforms could increase net revenues by around 0.6 percent of GDP, while reducing poverty and inequality (by 3.6 and 2.6 percentage points respectively). This would involve increasing the VAT base rate from 7 percent to 10 percent and cutting exemptions, the impact of which on lower-income households would be more than offset by additional, more targeted cash transfers (through Old Age Allowance and State Welfare Card payments), which could be provided at a fiscal cost well below the additional VAT revenues generated.

6.3 Planning and budgeting constraints for climate action

Thailand faces fragmentation among its central fiscal authorities, with no single entity overseeing the achievement of economic, fiscal, or climate change targets from an integrated perspective. The National Economic and Social Development Council (NESDC) develops a 5-year national development plan which aligns climate objectives with broader economic and social goals, including the United Nations Sustainable Development Goals (SDGs). But NESDC's role in the budget process is limited to providing strategic direction through developing an annual budget allocation strategy together with the Budget Bureau. It is important that the government continues to refine its public investment management procedures and capabilities to ensure that high-priority climate investments are properly designed, screened, budgeted for, and implemented in a coordinated manner.

Fragmentation disconnects the planning function from the budgeting system which results in multiple strategy documents/plans being prepared and essentially unfunded. NESDC focuses exclusively on planning without anchoring these plans into a medium-term fiscal framework (MTFF). There are overlapping processes, rules, and operating procedures required by different agencies that impose a very high transaction cost for ministries, departments, and agencies, and also dilute institutional accountability for results.

Moreover, the lack of a fully operational medium-term economic and fiscal framework limits Thailand's ability to project realistic fiscal costs of proposed climate actions.⁶ The government has multiple, overlapping multi-year plans related to climate adaptation and mitigation, but these plans are not effectively linked or informed by the medium-term resource envelope, and proposed investments are not costed, appraised, and prioritized. This makes it extremely difficult for the single-year budget system to allocate resources consistent with these plans. Moreover, the current MTFF is a rolling annual framework that is updated each year. As a result, the Bureau of Budget (BOB) does not use the expenditure projections of the outer years as a base for annual budget requests in the future years. This means that every year agencies are required to submit budget requests – even for multi-year projects that have received funding in the past. Budget requests are then debated and sometimes not approved or delayed. This disincentivizes agencies from undertaking multi-year climate projects.

Climate priorities are not systematically taken into account either in budget prioritization or monitoring and evaluation. Although Thailand has begun piloting climate change cost-benefit analysis (CCBA) in the Ministry of Agriculture and Cooperatives (MOAC) and the Ministry of Energy (MOEN), CCBA is not systematically taken into account by either the BOB or the Legislature as they consider budget prioritization. Moreover, monitoring and evaluation of climate expenditures is technically challenging due to the long gestation of climate-related investments. Detailed project-based evaluations are limited in number and no climate-related projects have been evaluated recently.

⁵ The [Thailand Public Revenue and Spending Assessment \(2023\)](#) shows that such revenue reforms could fund a substantially larger increase in social protection spending than what is recommended in this CCDR (i.e. more than encompassing the increase in social protection spending recommended here for climate adaptation purposes), as well as additional spending in other areas, while reducing debt to GDP to around 40 percent by 2050, from just below 70 percent as at mid-2025.

⁶ Thailand has a five-year National Development Plan, four-year Government Administrative Plan, 32 annual Ministerial Operating Plans, 76 Provincial Development Plans, 18 Regional/Cluster Development Plans, and more than 5,000 local authority development plans.

To address these challenges, Thailand may need to transform its economic and fiscal institutions to mount more effective whole-of-government responses. This includes building stronger technical capabilities in policy analysis, enhancing coordination of government-wide actions (including between national and local levels), and adopting a more integrated approach linking economic policies, budget planning, and climate adaptation efforts. Refining the current MTFF, implementing a robust expenditure review and policy/program evaluation system, and further fiscal decentralization would help Thailand plan for long-term economic stability and align fiscal policies with sustainability and climate resilience goals.

6.4 Mobilizing private capital

Thailand needs to mobilize climate finance at scale to support the climate transition. Private capital will have to complement public resources to help Thailand close its climate investment gap. The financial sector can play an active role in supporting this by helping mobilize and allocate capital through a variety of instruments such as sustainability-themed bonds, green loans, insurance etc.

With substantial growth in recent years, Thailand's thematic bond market has played an increasing role in channeling private capital towards climate investment. According to the Thai Bond Market Association (ThaiBMA), the value of issuance of sustainability-themed bonds, referred to as Environment, Social and Governance (ESG) bonds in Thailand, has been growing fast, recording a compound annual growth rate (CAGR) of 104.3 percent between 2019 and 2024 (Figure 6.5). This market is dominated by sustainability bonds (around 70 percent of total market value) which finance projects with combined green and social objectives. Green bonds and sustainability-linked bonds (SLB) account for around 17 percent and 11 percent respectively.

The Thai government has been the largest issuer of Thailand's sustainability bonds, accounting for almost 70 percent of the total ESG bond market (Figure 6.6). Since the Covid-19 pandemic, the government has issued multiple sovereign bonds to mobilize green finance. In November 2024, the government issued a milestone 30-billion-baht sovereign SLB, the first in Asia and only third globally, with key performance indicators (KPIs) and sustainability performance targets (SPTs) linked to greenhouse gas emissions and the sales of electric vehicles. The SLB mobilized additional climate finance to Thailand from a broad range of investors including life insurance companies, funds, financial institutions, securities firms, asset management companies and foreign investors. As of January 2025, the ThaiBMA data estimates the outstanding value of government's green and sustainability bonds is as high as 529.5 billion THB (15.4 billion USD), or around 66.8 percent of the total outstanding value of all ESG bonds in Thailand.

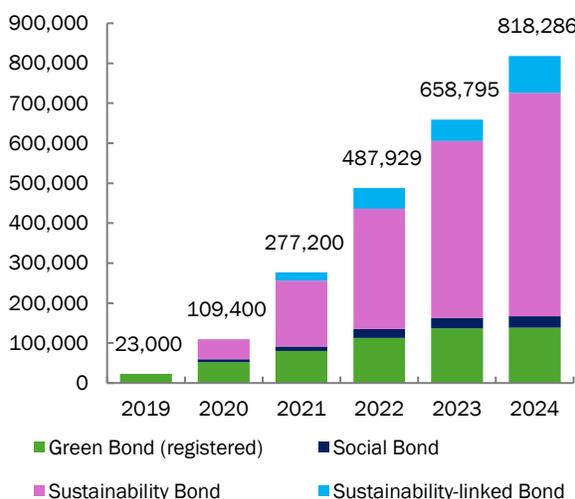
Private sector issuance of sustainability-themed bonds accounts for the remaining 30.5 percent of total ESG bonds outstanding, with green bonds being the most common instrument. Most of the proceeds from green bonds issued by Thai corporates are allocated to fund climate change mitigation projects in the energy and transport sectors. As of January 2025, long-term corporate green bonds have an outstanding value of 120 billion THB, 10 percent of which are foreign bonds. The number of issuing companies is still very limited: all outstanding corporate ESG bonds originate from only 22 companies, the majority of which are in energy and banking. For the sustainability bonds and SLBs, the sizes of private issuances are much smaller. Complementing capital market instruments, banks are also offering sustainable finance products in the form of green loans to businesses and individuals. Recently, many private companies in Thailand have been securing green loans and Sustainability-Linked Loans (SLLs) with commercial banks. Though there is no existing market size estimation yet, current trends suggest that the green loan market is growing.

The growth of the sustainable finance market in Thailand reflects a concerted effort to strengthen the overall sustainable finance ecosystem. The Working Group on Sustainable Finance was established to implement reforms across five pillars: taxonomy, data, products and services, incentives, and human

capital. In 2022, the Thai Bankers' Association (TBA) issued an ESG Declaration with six priorities to guide member banks. Since 2023, the Bank of Thailand has been requiring banks to assess climate-related financial risks and offer green financial products. The first phase of the Thailand Taxonomy, launched in July 2023, covers the energy and transport sectors, with Phase 2—expanding to agriculture, construction and real estate, manufacturing, and waste management sectors—launched in May 2025. The taxonomy aims to standardize asset classification and support green and transition finance. Separately, the Securities and Exchange Commission (SEC) mandated ESG and climate risk disclosure in listed companies' annual reports, aligning with TCFD recommendations. In June 2025, the SEC also waived filing fees for sustainable debt instruments aligned with the Thailand Taxonomy or the Asean Taxonomy. On the banking side, commercial banks are encouraged to support lending for a greener, climate-resilient economy. For example, through the “Financing the Transition Program” supported by the Bank of Thailand (BOT), eight commercial banks are offering green loan products tailored for SME's needs.

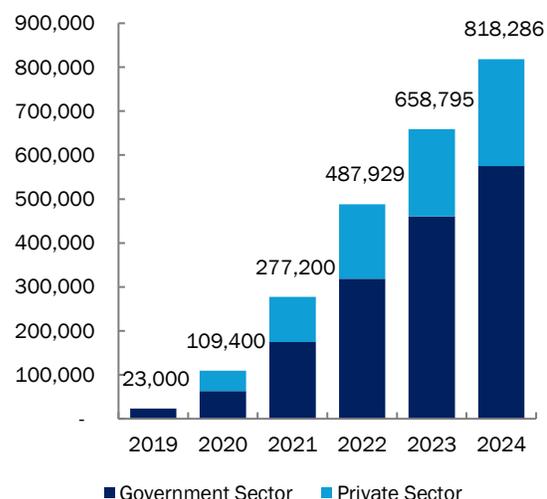
Despite these developments, the green and sustainable finance markets have not yet reached the scale required to meet Thailand's climate goals. While Thailand leads many regional peers, its sustainable debt market⁷ remains relatively shallow—with issuance averaging around 1 percent of GDP per year in recent years— and well below levels seen in advanced economies and some emerging market and developing economy (EMDE) peers. Among 94 economies with sustainable debt issuances between 2018 and 2022, Thailand ranks 42nd in market depth⁸, ahead of Viet Nam (44th), Indonesia (46th), Malaysia (50th), and the Philippines (75th), but trails far behind regional outlier Singapore, which ranks 2nd with outstanding sustainable debt exceeding 16.7 percent of GDP.

Figure 6.5: Thailand's ESG bonds outstanding value (2019-2024) by type of bonds, in million THB



Source: ThaiBMA, 2024 Bond Market Highlights

Figure 6.6: Thailand's ESG bonds outstanding value (2019-2024) by type of issuers, in million THB



Source: ThaiBMA 2024, Bond Market Highlights

Demand side challenges – including limited awareness, expertise and policy incentives, a lack of bankable pipeline projects, and high issuance costs – constrain further market growth. ESG and climate finance literacy remains low among borrowers in Thailand, especially mid-sized corporates and SMEs, limiting demand for sustainability-linked loans, green credit lines, and labeled sustainable

⁷ Including the issuance of both sustainable loans and sustainable bonds.

⁸ Defined as total outstanding sustainable loans and bonds at a given point in time.

bonds. While large firms have made progress, smaller enterprises often lack the resources and expertise to adopt ESG-aligned financial strategies. Policy incentives for green finance also remain limited: existing tax measures, such as those for energy efficiency, are not comprehensive enough to drive industrial decarbonization, EV adoption, or circular economy efforts. In contrast, peers like Viet Nam and Malaysia offer more structured tax incentives. The pipeline of bankable climate projects remains limited due to regulatory uncertainty, inadequate de-risking tools and weak revenue structures. High costs of issuing sustainable bonds and accessing green loans further dampen demand.

Investors also face several supply-side constraints, including most importantly information barriers. In the past, sustainable finance in Thailand has been held back by inconsistent green finance definitions and a lack of standardized methodologies for identifying green assets, creating information barriers for financial institutions, which in turn have contributed to increased uncertainty and heightened greenwashing risks. While the introduction of the taxonomy aims to address these gaps, its early-stage implementation requires greater capacity building and policy support. Further, financial institutions have limited capacity to originate green assets and there is also a lack of standardized financial instruments. These challenges constrain investment in many mitigation-oriented green sectors such as EV infrastructure, renewables, and industrial decarbonization, as well as other sectors of importance to climate objectives such as blue finance and adaptation finance. Another issue concerns the lack of alignment between the financial architecture and the long-term nature of climate investments. Banks primarily offer 3–7 year loans, while green infrastructure projects require 15–20 year financing. This maturity mismatch, coupled with the absence of a green securitization framework, limits capital recycling and pressures banks' capital buffers under Basel III, constraining new green lending. At the same time, without standardized climate risk assessments or capital requirements, green assets are priced like conventional loans, overlooking transition and physical risks. High FX hedging costs, limited local-currency instruments, and the lack of credit enhancements—such as first-loss guarantees—deter foreign investment and inhibit large-scale private sector financing.

6.5 Carbon finance

Although small, Thailand's voluntary carbon market is growing rapidly and could play an important role in financing climate investment. Thailand is emerging as a regional leader in carbon finance, with a domestic registry, a successful Article 6.2 transaction, and rapidly growing market infrastructure. The Thailand Voluntary Emission Reduction Program (T-VER), managed by TGO, underpins the voluntary carbon market by certifying emission reductions across sectors like renewable energy, agriculture, and forestry. Since 2013, T-VER has grown steadily, with credits issued increasing at a 63 percent CAGR between 2016–2022. Average issuance prices rose from 35 THB (1.06 USD) in 2020 to 107 THB (3.23 USD) in 2022, pushing total trading value to 146.7 million THB (4.4 million USD).⁹

Thailand could further capture opportunities to mobilize climate finance from the carbon credit market, both domestically and internationally. Despite recent increases, the price of carbon credits in Thailand remains relatively low compared to advanced markets. Even at peak secondary market prices of 1,700–2,076 THB (51–63 USD), T-VER credits still trade below EU (USD 82) and UK (USD 56) allowances. This presents an opportunity for Thai businesses to tap into higher-value international markets by developing high-quality credits. TGO's adoption of Verra's VCS and introduction of T-VER premium standards are important steps. Domestically, initiatives like the FTIX trading platform and regulatory sandboxes led by TGO, ERC, and FTI aim to improve market efficiency. However, further efforts are needed to reduce market fragmentation, scale up project aggregation, and strengthen the regulatory framework to support a robust, export-ready carbon market.

⁹ The biggest purchases of carbon credits are organizations in the manufacturing, banking and finance, transport, and real estate industries, although a growing area of demand is the need to offset emissions from events. See Leenoi, P., (2023), *Carbon Credits A Mechanism for Achieving Sustainability Targets*, Krungsri Research.

Building on this momentum, Thailand’s Low Carbon City (LCC) Program is laying the institutional and technical foundation to dramatically scale carbon finance flows into the country. The program goes beyond traditional project-level interventions by establishing national systems that treat carbon credits as formal financial assets—integrated into investment planning, budget execution, and public financial management. Specifically, Thailand is creating a comprehensive architecture that enables both the origination and monetization of credits tied to infrastructure upgrades in the public sector (such as schools, hospitals, street lighting, and water treatment plants), while simultaneously building mechanisms to procure verified emission reductions from private actors who decarbonize their buildings, vehicles, or operations. These credits are then eligible for sale into domestic and international carbon markets, positioning Thailand as a trusted supplier of high-quality, measurable, and verifiable climate outcomes.

This ambitious effort makes Thailand one of the first upper-middle-income countries to design a carbon market system embedded within national investment programs. Under the LCC, agencies such as the Department of Climate Change & Environment (DCCE) under the Ministry of Natural Resources and Environment (MONRE), the Public Debt Management Office (PDMO) under the Ministry of Finance (MOF), EXIM Bank, Bangkok Metropolitan Administration (BMA), and Industrial Estate Authority of Thailand (IEAT) are piloting transaction models that link concessional lending and performance-based grants to the generation of carbon assets, with support from digital MRV systems and internationally accepted verification protocols. The Stock Exchange of Thailand (SET) is working with regulators to enable cross-border credit sales, while the Securities Exchange Commission, Bank of Thailand, and Ministry of Finance are exploring how to treat carbon as a tradeable financial instrument. If successful, the LCC’s integrated model, combining public investment, carbon credit generation, regulatory oversight, and market access, could offer a replicable blueprint for peer countries seeking to leverage carbon markets to finance green infrastructure and meet their climate goals.

6.6 Insurance

Insurance currently plays a relatively limited role as a source of financing for climate adaptation and resilience. Current insurance solutions do not adequately cover climate and natural disaster risks, which could impact the agricultural sectors and the broader economy. Thailand’s crop insurance program currently covers a few key agricultural products, such as rice, sugarcane, and rubber. Climate risk coverage in forestry, fishery, energy, and tourism is still missing. For properties, coverage for floods and windstorms is usually available as an add-on to standard insurance products for homes, automobiles, and Industrial All Risks (IAR), where buyers pay an additional premium for limited coverage of the climate-related risks. Additionally, climate-vulnerable groups such as smallholder farmers, MSMEs, informal workers, and low-income individuals have limited access to life and health insurance, which offer protection in the face of severe climate disasters and increasing pollution.

The government and the insurance industry have taken steps to expand the incorporation of climate risks into different aspects of national, industry and company strategies. The Thai government has explored options to expand disaster risk finance mechanisms and reduce financial risks associated with natural disasters. For example, Thailand’s National Catastrophe Insurance Fund (NCIF) was established in 2012 to help the country manage the financial impact of major natural disasters, particularly floods and other catastrophic events. The NCIF is funded through a combination of public and private sources, including government contributions, premiums paid by insured entities, and international support. The government has also explored options for issuing catastrophe bonds. Insurance companies have been developing products that incentivize risk reduction behaviors. For instance, companies may reduce premiums if basic flood protection measures are implemented. In June 2025, a sandbox has been announced to pilot weather index insurance that utilizes GIS and IoT technology to provide parametric flood coverage for crops. Several insurers are also starting to incorporate climate risk models into their pricing and underwriting practices to better assess and

manage potential losses. Finally, AI, geospatial analytics, and satellite imagery can significantly strengthen climate risk underwriting, making insurance products more scalable and investable. Combined with parametric insurance, sovereign risk pools, and tools like catastrophe bonds, these innovations deepen market capacity and attract institutional capital. For example, China's Weather Index Insurance project (2020–2023) exemplifies this potential: digitizing 72 index-based products and partnering with major agri-insurers provided \$470 million in coverage to over 46,000 rural households. The shift to parametric payouts enabled faster disbursements during climate shocks and COVID-19, strengthening both household resilience and market efficiency.

6.7 How can the financial sector further contribute to Thailand's climate goals?

Building on recent progress in advancing sustainable finance, Thailand could take additional steps to further enhance climate risk management in the financial system (“greening finance”) and accelerate capital allocations towards sustainable investment to capture new opportunities (“financing green”):

- **Enhance climate risk monitoring in portfolios and expand the scope of evaluation to non-financial corporates:** The banking sector should incorporate physical and transition risks in their risk assessment and management process, yet only large counterparties and listed companies in Thailand have adopted climate risk assessments. Both regulators and banks should help encourage private companies to conduct proper climate risk assessments, including the emission profile of their activities, to reduce the information gaps for banks in providing climate finance, as well as managing the risk associated with it.
- **Broaden climate finance product offerings to support green sectors.** Incentives could be provided to encourage financial institutions to deepen the offering of products like green loans, green bonds, and sustainability-linked bonds and loans. In addition, more sectors beyond energy and transport should be encouraged to upscale green investment and gain access to climate finance. For example, institutional capital mobilization for green buildings and infrastructure remains crucial to scale green finance in Thailand's real estate and infrastructure sectors. Specifically, green mortgage-backed securities are underutilized, presenting an opportunity for local banks to aggregate green mortgages into investable tranches for pension funds and sovereign wealth funds. At the same time, Thailand could further mobilize institutional capital toward green building and infrastructure by expanding use of green and sustainability-linked asset-backed securities (ABS), real estate investment trusts (REITs) for certified buildings, and securitized energy performance contracts (EPCs). To further increase private-sector participation in green infrastructure, de-risking financial instruments are essential. Innovations such as outcome-linked bonds (e.g., carbon emission reduction-linked bonds, Plastic Waste Reduction-Linked Bonds) should also be explored.
- **Provide climate financial solutions that are customized to fit MSME needs:** SMEs are particularly vulnerable to the impacts of climate change, yet they often lack the financial resources, incentives and expertise needed to adapt. Given these challenges, extra support must be provided to MSMEs. Policymakers should enforce or incentivize private financial institutions to provide accessible, affordable financing options like green loans and grants with favorable terms, i.e. lower rates and longer tenor, to MSMEs. For example, since most companies face their greatest carbon footprint challenges in Scope 3—particularly within their supply chains—the leading 1 percent of firms can play a catalytic role in driving decarbonization efforts downstream. These companies are well-positioned to engage their supply chain partners, especially SMEs, which often lack both climate awareness and access to financing. An ecosystem and platform-based approach can help bring these SMEs into the fold. Sustainable-linked supply chain finance and mechanisms like Energy Service Company (ESCO) models and on-bill financing could be instrumental in enabling this transition. Provision of capacity-building programs and training can be helpful in the long run. Microinsurance for

vulnerable communities and index-based models for quick payouts could also be developed to enable MSMEs to access financing, for example, after a major flood that disrupts business.

- **Further strengthen the sustainable finance ecosystem through improved climate finance tracking, taxonomy implementation, and enhanced disclosure practices.** More accurate climate finance data are required to support optimal decisions for capital allocations. Going forward, standardized tracking definitions and methodologies should be applied to systematically track and monitor the sources and use of climate finance against key climate policy objectives. With frameworks and tools such as the Thailand Taxonomy in place, the next step is rigorous implementation, which requires both regulatory and industry actions to develop practical guidelines, enhance enforcement, incentivize adoption, build capacity, and foster collaboration. To build a more robust green finance ecosystem, the government and regulators could also strengthen ESG disclosure requirements for both private companies and banks.
- **Thailand is well-positioned to lead carbon market development in the region by advancing legal, regulatory, and market infrastructure reforms that enhance the credibility, liquidity, and international accessibility of its carbon credits.** As the country prepares to launch a national Emissions Trading System (ETS) and expand its voluntary market (T-VER), coordination among financial, environmental, and capital market regulators will be essential to fully integrate carbon into the financial system.
- **Key actions to help establish Thailand as a regional carbon finance hub include:**
 - **Formalize accounting treatment of carbon credits:** The Securities and Exchange Commission (SEC) can issue guidance on the accounting and financial treatment of carbon credits across different markets—international, domestic voluntary, and compliance—to enable banks and corporates to treat them as standardized financial instruments for investment and risk management purposes.
 - **Pursue international certification for T-VER Premium:** TGO could seek CORSIA certification for T-VER Premium credits, opening new aviation-sector demand and bolstering international credibility. In parallel, TGO could work with ASEAN counterparts to explore the creation of A-VER (ASEAN Verified Emission Reduction) credits—a shared regional standard that meets international quality thresholds while leveraging local management and lowering certification costs.
 - **Expand exchange infrastructure for carbon trading:** The Stock Exchange of Thailand (SET) could establish a unified carbon exchange that serves both the domestic ETS and the international voluntary market, including high-integrity bilateral Article 6 trades. To maximize market access and reduce transaction costs, SET can explore interoperability with other regional platforms such as Malaysia’s Bursa Carbon Exchange and global registries like Verra or Gold Standard.
 - **Enable aggregation and securitization:** Regulators and market players could also facilitate the bundling of credits from smaller projects—particularly in agriculture, industry, and MSME sectors—into aggregated carbon portfolios that can be securitized or sold through standardized auction mechanisms, attracting institutional investors and reducing per-credit costs.



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