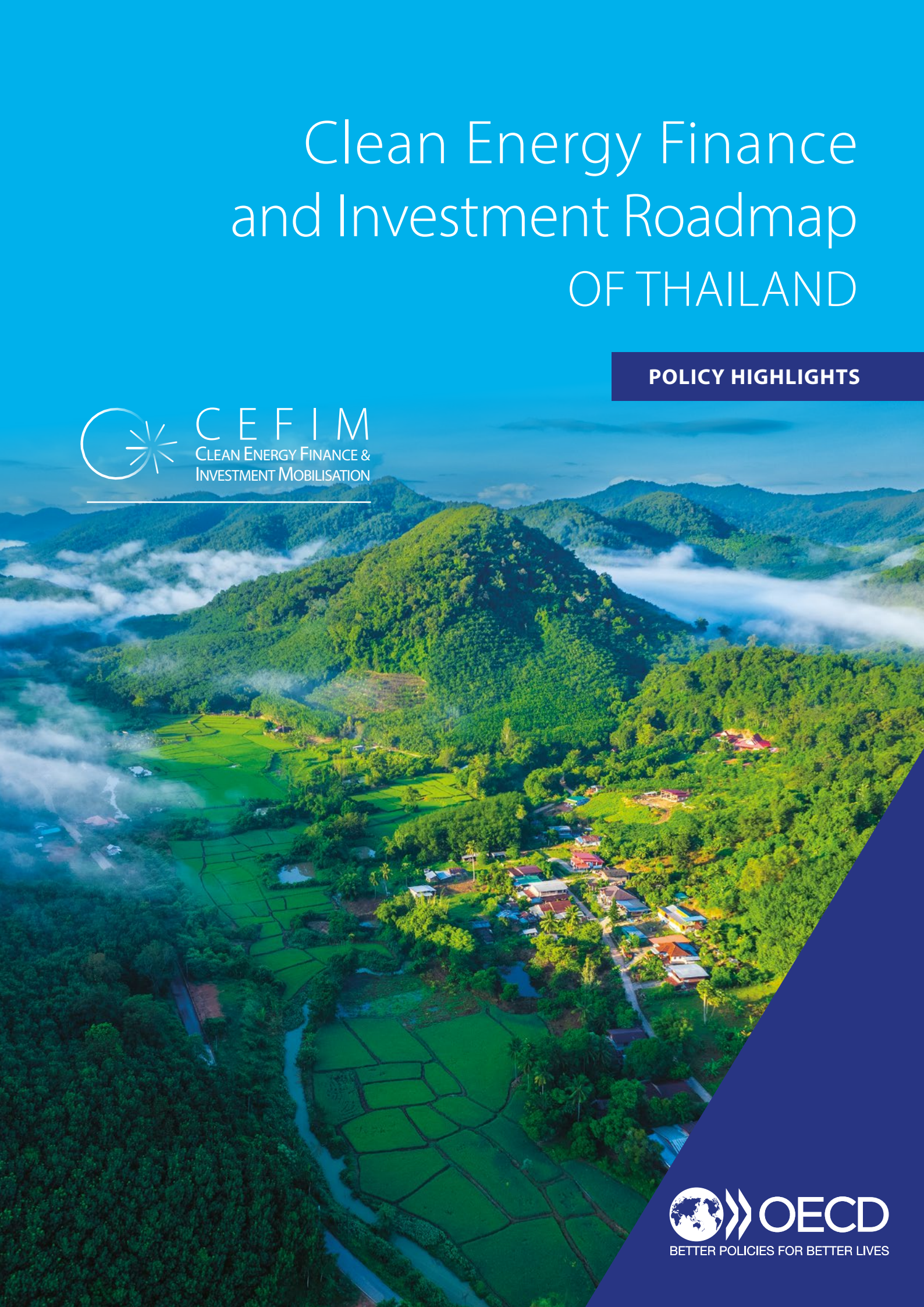
Clean Energy Finance and Investment Roadmap OF THAILAND

POLICY HIGHLIGHTS

CEFIM
CLEAN ENERGY FINANCE & INVESTMENT MOBILISATION



OECD
BETTER POLICIES FOR BETTER LIVES

PREFACE

In recent years, Thailand has scaled up its ambition to reduce greenhouse gas (GHG) emissions. The country updated its Nationally Determined Contribution in 2022, committing to reduce GHG emissions by 30% by 2030 from the 2005 level, while continuing its efforts to meet the long-term goal of carbon neutrality by 2050 and net-zero GHG emissions by 2065. To achieve these objectives, Thailand's Long-Term Low Emissions Development Strategy (LT-LEDS) aims to increase new power generation capacity from renewables, as reaching carbon neutrality would require increasing the share of renewable electricity from 13% of total electricity generation in 2022 to 68% by 2040 and 74% by 2050.

Achieving these targets will require a rapid acceleration of finance and investment in renewable power and energy efficiency: it is estimated that a total investment of approximately THB 779 billion (USD 22 billion) in new renewable power is required between 2022 and 2037, while investment in energy efficiency improvements in industrial, commercial, residential and agricultural sectors would need to reach THB 974 billion (USD 28 billion) over the same period. Scarce public finance, both domestic and international, will need to be used more effectively to leverage private finance and de-risk investments in clean energy.

This *Clean Energy Finance and Investment Roadmap of Thailand* ("the Roadmap") provides tailored recommendations for the Government of Thailand to help unlock finance and investment in clean energy. The recommendations are based on extensive stakeholder consultations, new modelling and analysis, as well as emerging international practices tailored to Thailand's national circumstances. The Roadmap was developed as part of the OECD Clean Energy Finance and Investment Mobilisation (CEFIM) Programme, which aims to accelerate finance and investments in selected emerging economies in clean energy, including renewable power, energy efficiency and decarbonisation of industry.

The Roadmap focuses on two clean energy sectors identified and selected in consultation with the Department of Alternative Energy Development and Efficiency (DEDE) of the Ministry of Energy of Thailand: small-scale renewable power and energy efficiency in the building sector, with a focus on cooling. In addition to mitigating GHG emissions, the deployment of small-scale renewables systems in Thailand could increase energy security, deliver energy cost savings, provide green jobs for local businesses and improve access to clean power in rural communities and off-grid islands. To support the Government of Thailand in promoting and de-risking small-scale renewable power investment, the Roadmap provides recommendations on financial support; policy, regulation and governance; and capacity building.

Incentivising finance and investment in energy efficiency in buildings and cooling appliances is another key action area for Thailand. As one of the largest consumers of electricity in the country – representing on average approximately 25% of the total electricity consumed in Thailand in 2019 – and as temperatures continue to rise, the building sector has a high demand for energy-intensive cooling appliances. As cooling made up for over half of the Thai commercial building sector's electricity consumption and 20% of its GHG emissions, improving the energy efficiency of cooling applications is a critical priority to reach Thailand's 30% energy intensity reduction target by 2037 (compared to 2010 levels), under its draft Energy Efficiency Plan (EEP).

The recommendations presented in this report can serve as a roadmap to help Thailand strengthen conditions to unlock the much-needed finance and investment to achieve its clean energy transition. Going forward, the OECD can support the Government of Thailand in implementing the Roadmap's recommendations, including through tailored analysis, capacity building and knowledge sharing activities, to boost investments in renewables and energy efficiency.

Mathias Cormann
Secretary-General, OECD

About the OECD Clean Energy Finance and Investment Mobilisation Programme

The OECD Clean Energy Finance and Investment Mobilisation (CEFIM) Programme aims to strengthen domestic enabling conditions to attract finance and investment in renewables, energy efficiency and decarbonisation of industry (clean energy) in emerging economies. The programme supports countries in the development of policies and instruments to help scale up a pipeline of bankable clean energy projects.

The Clean Energy Finance and Investment Roadmap of Thailand

The **Clean Energy Finance and Investment Roadmap of Thailand** presents a clear action plan that identifies and addresses bottlenecks constraining finance and investment in Thailand's clean energy sector. The Roadmap focuses on two areas: (i) renewable power, with special attention to small-scale systems, and (ii) energy efficiency in large-scale public and commercial buildings, with a focus on cooling applications. The Roadmap was developed in close collaboration and co-ordination with the Department of Alternative Energy Development and Efficiency (DEDE) of the Ministry of Energy of Thailand. The Thai consultancy firm, The Creagy, provided support to the OECD throughout the process of developing the Roadmap.

To develop the Roadmap, the OECD undertook an extensive stakeholder consultation process that included hosting in-person workshops as well as conducting multiple bilateral interviews by key public and private stakeholders. The process helped to identify the main challenges and potential solutions to unlock finance and investment in clean energy in Thailand. The consultations were supplemented with desk-based research and data analysis, as well as case studies of financing mechanisms developed in other countries. The Roadmap includes estimates of the financing and investment needs required to meet Thailand's renewable energy and energy efficiency plans, based on a model developed by The Creagy.

Over the course of 2023, two in-person workshops in Thailand have been jointly held by the OECD and DEDE:

- Workshop I (April 2023) to assess critical barriers, identify potential solutions to improve enabling conditions and financing as well as to collect feedback and data to estimate the financing required to meet Thailand's clean energy plans.
- Workshop II (November 2023) to present results of the estimated financing needs, key findings of the Roadmap and discuss emerging policy recommendations, and to reach consensus on the Roadmap action plan.

Further details on the stakeholder consultation workshops and related summaries can be found **here**.

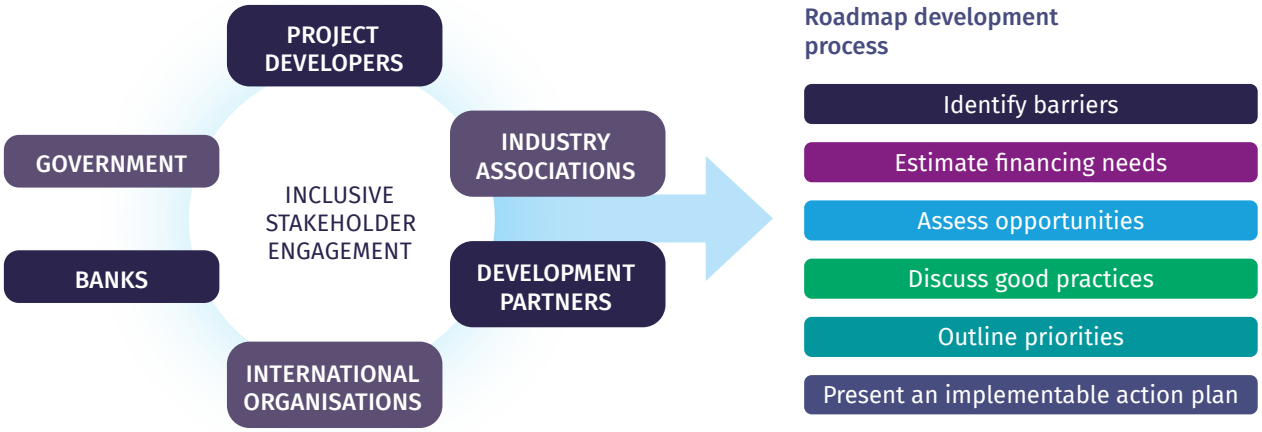
The Clean Energy Finance and Investment Roadmap of Thailand was made possible with funding from the Government of Denmark.

FIGURE 1

Roadmap objectives

FIGURE 2

Roadmap development process



ROADMAP ACTION PLAN: KEY RECOMMENDATIONS

Thailand has adopted ambitious clean energy targets to meet its long-term climate goals, committing to reach carbon neutrality by 2050 and net zero greenhouse gas (GHG) emissions by 2065.

Transforming Thailand's energy system is critical to meet the country's climate goals, as the energy sector accounted for 69% of total GHG emissions in 2018, as well as broader development objectives, including access to affordable energy and job creation.

To achieve its climate goals, Thailand's Long-Term Low Emissions Development Strategy (LT-LEDS) includes a target to reach 50% of new power generation capacity from renewables by 2050. Thailand's LT-LEDS estimates that the share of renewable electricity will be 68% of total electricity generation by 2040 and 74% by 2050. The country's share of renewable energy was about 13% of total generation in 2022.

Achieving Thailand's clean energy targets as well as broader development objectives will require rapidly accelerating finance and investment in renewable power and energy efficiency in Thailand.

This section summarises the Roadmap Action Plan, which outlines critical actions and recommendations to mobilise financing and investment, and can serve as guidance for the Government of Thailand, regulators, international development providers, as well as the private sector, to unlock finance and investment in clean energy in Thailand.

TABLE 1
—
Unlocking finance and investment for small-scale renewable power and energy efficient buildings in Thailand

● blue text : small-scale renewables
● green text : energy efficiency in buildings

Key topic area	Recommendations	Timing	Leading agency	Implementers
Financial support	Reviewing and strengthening existing public financial incentives to prioritise the acceleration of small-scale and community-based renewable energy models	Short-term (ST)	DEDE	DEDE and MOF
	Improving conditions of green loan programmes for Micro-, Small- and Medium-sized Enterprises (MSMEs)	S-T	DEDE	DEDE, FIs and ESCOs
	Developing aggregation and securitisation models for small-scale renewables	S-T	DEDE	DEDE, FIs, development partners, ESCOs
	Providing financial support to Pay-as-you-go (PAYG) models to expand off-grid renewables	S-T	MOEN	MOEN, ESCOs, DFIs, DEDE, electricity authorities and development partners
	Piloting a credit guarantee scheme for small-scale renewables projects	Medium-term (M-T)	DEDE	DEDE, TCG, DFIs, commercial banks, ESCOs and development partners
	Piloting on-bill financing and energy savings insurance (ESI)	S-T	DEDE	DEDE, utilities, FIs, ESCOs and development partners
	Establishing a bulk procurement model for energy-efficient cooling appliances	S-T	DEDE	DEDE, utilities, provincial authorities, ESCOs and development partners
	Conducting ex-post evaluations of the Energy Efficiency Revolving Fund and the ESCO Fund	S-T	DEDE	DEDE and independent evaluators
	Maintaining consistent public support to promote the ESCO market	M-T	DEDE	DEDE, ESCOs and FIs
	Fostering the uptake of green bonds in the building sector	M-T	DEDE	DEDE, MOF, SEC, and FIs

Notes

A • BOT = Bank of Thailand; COE = Council of Engineers Thailand; CSOs = civil society organisations; DEDE = Department of Alternative Energy Development and Efficiency of the Ministry of Energy; DFIs = development finance institutions; DSD = Department of Skill Development; EGAT = Electricity Generating Authority of Thailand; ERC = Energy Regulatory Commission of Thailand; ESCOs = Energy Service Companies; FIs = financial institutions; MEA = Metropolitan Electricity Authority; MOEN = Ministry of Energy; MOF = Ministry of Finance; MOIN = Ministry of Industry; MONRE = Ministry of Natural Resources and Environment; PEA = Provincial Electricity Authority; SEC = Securities and Exchange Commission; TCG = Thai Credit Guarantee Corporation and TPQI = Thailand Professional Qualification Institute. **B** • S-T = short-term; M-T = medium-term

Key topic area	Recommendations	Timing	Leading agency	Implementers
Policy, regulation and governance	Strengthening policy planning and setting region-specific targets on small-scale renewable energy over the near- and long-term	S-T	DEDE	DEDE
	Enhancing energy policy predictability	S-T	MOEN	DEDE and EPPO
	Encouraging financial institutions to assess and disclose taxonomy alignment of their portfolios	S-T	BOT	BOT, SEC and relevant ministries (MONRE, MOF and MOEN)
	Simplifying renewable energy licensing and permitting processes and requirements	S-T	ERC	ERC, MOEN, EGAT, MEA and PEA
	Improving consistency and harmonisation of grid codes and regulations	M-T	ERC	ERC, EGAT, MEA and PEA
	Strengthening the regulatory environment for financial securitisation of renewable energy assets	M-T	BOT	BOT, MOF and MOEN
	Incrementally increasing stringency of minimum energy performance standards and expanding air conditioning labelling to large commercial buildings	S-T	EGAT and DEDE	EGAT, DEDE, MOEN, TISI, research centres and academia
	Setting up an institutional co-ordination scheme and revising roles and responsibilities of energy efficiency standards implementing agencies	S-T	MOEN	MONRE, MOF, MOEN and MOIN
	Strengthening the regulatory framework for district cooling	M-T	DEDE	DEDE and local authorities
	Developing an Energy Efficient Technology List (EETL) and collaborating with financial institutions to provide financial incentives to the listed technologies and providers	M-T	DEDE	DEDE and financial institutions
Capacity building, data collection and awareness	Building capacity of MSMEs, financial institutions and technicians and developing training programmes	S-T	DEDE	DEDE, TPQI, COE, DSD, academia, research centres, FIs, industry associations, ESCOs and development partners
	Implementing consumer awareness and education campaigns and fostering community engagement	M-T	DEDE	DEDE, academia, research centres, ESCOs, CSOs and development partners
	Fostering data collection on small-scale renewable capacity and financing	M-T	DEDE	DEDE, utilities, business associations and ESCOs
	Establishing capacity building and training programmes on energy efficiency for the building sector	M-T	DEDE	DEDE, TPQI, COE, DSD, academia, research centres, business associations, ESCOs and development partners
	Increasing consumer awareness campaigns for efficient buildings and cooling systems	M-T	DEDE	DEDE, academia, research centres, business associations, ESCOs and development partners
	Fostering data collection on energy savings of energy-efficient buildings and cooling systems	M-T	DEDE	DEDE, business associations and ESCOs

POLICY LANDSCAPE AND TRENDS

The structure of the power system in Thailand is an enhanced single-buyer system, whereby the state-owned utility, the Electricity Generating Authority of Thailand (EGAT), purchases electricity from both its own generation assets and from private power producers, and operates its own grid network.

OVERVIEW OF THAILAND'S POWER SECTOR

Thailand's power sector is characterised by generation overcapacity and a high reserve margin of around 40%. Thailand's electricity generation primarily relies on natural gas, constituting 53% of total generation in 2022 (Figure 3), while renewable power accounted for 13%, generated mainly from biomass, solar and hydro (Figure 4).

FIGURE 3
—
Electricity generation by fuel type [2022]

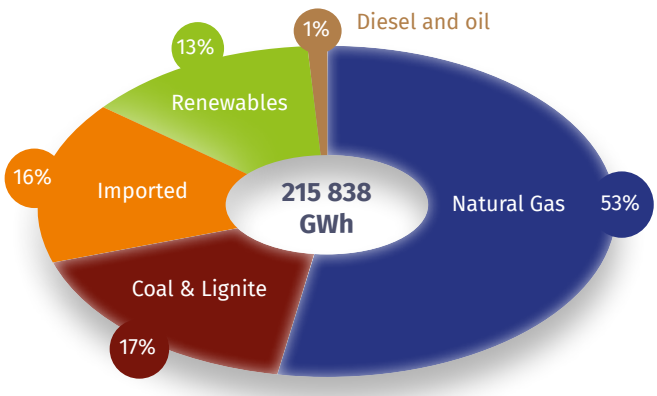
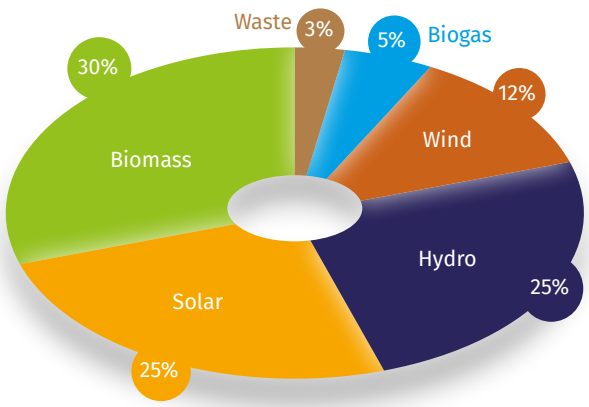


FIGURE 4
—
Electricity generation by renewable fuel [2022]



KEY STATISTICS [2022]	
Installed capacity	**54** GW
Electrification rate	**99%**
Share of renewables in power mix	**13%**
Peak demand	**35**GW
Average electricity price	**113.39 USD**/MWh in 2022

Thailand is endowed with large solar, wind and biomass resource availability. Thailand receives high solar irradiance, especially in the central region of the country. This creates strong potential for utility-scale and grid-connected solar photovoltaic (PV) systems as well as small-scale distributed solar, such as rooftop PV. The IEA estimates that if 10% of the available estimated rooftop surface was used for distributed solar PV, the capacity hosted would be larger than the system's peak demand.

On average, Thai households pay between 1.1 – 3.7% of their income on electricity, which is relatively low when compared to other ASEAN countries. Residential electricity tariffs range between 2.4 – 4.2 Thai baht (THB) per kWh (0.06 – 0.11 USD/kWh), which are added to a monthly service charge of 8.2 - 38.2 THB/month (0.22 – 1.04 USD/month). Low-income households can have access to electricity subsidies if they exceed 150 kWh per month.

INSTITUTIONAL CONTEXT OF THAILAND'S ENERGY POLICY

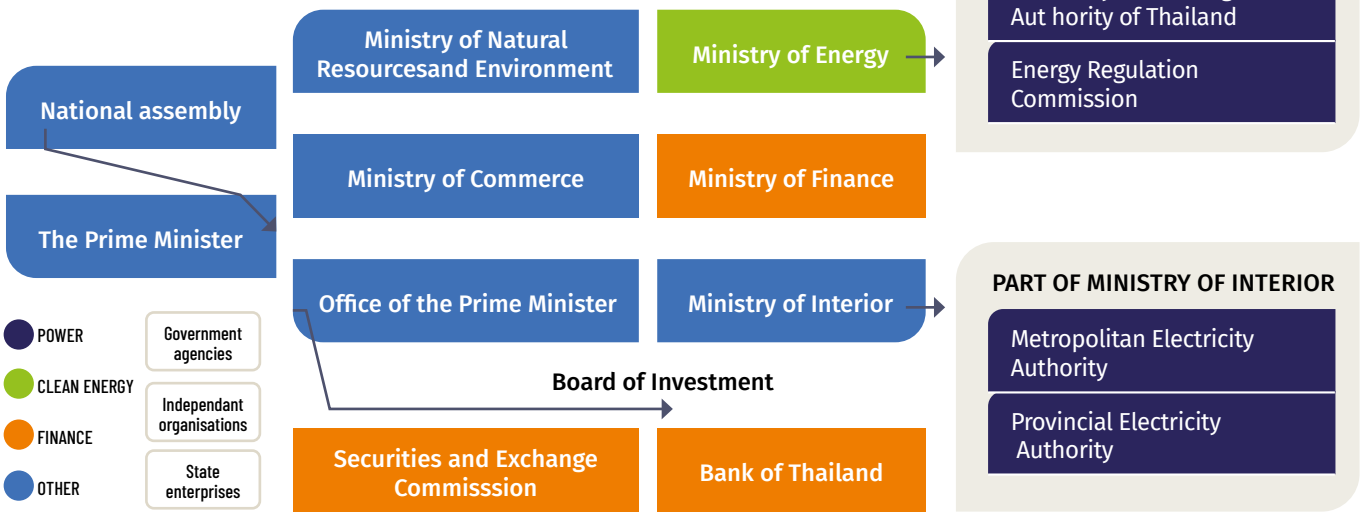
The Ministry of Energy (MOEN) governs the energy and electricity sector in Thailand and has the main responsibility over renewable energy and energy efficiency policies.

Several other institutions are responsible for areas related to clean energy finance and investment regulations in Thailand:

- The Electricity Generating Authority of Thailand (EGAT) is a state-owned enterprise under the supervision of the Ministry of Energy and Ministry of Finance.
- The Metropolitan Electricity Authority (MEA) and the Provincial Electricity Authority (PEA), supervised by the Ministry of Interior, are distribution utility companies.
- The Energy Regulatory Commission (ERC) of Thailand is an independent agency whose mission is to regulate energy industry operations, including the electricity industry, the natural gas industry and the energy network.
- On the investment side, the Board of Investment (BOI) is a government agency under the Office of the Prime Minister, which promotes inward and outward-bound investments, including for energy-related sectors.
- The Bank of Thailand (BOT) is Thailand's central bank, which formulates and implements monetary policies, supervises and regulates financial institutions, and manages foreign exchange.
- The Securities and Exchange Commission (SEC) aims to ensure an efficient, dynamic and inclusive functioning of Thailand's capital market.

Currently, the Energy Policy and Planning Office (EPPO) of Thailand's Ministry of Energy (MOEN) is in the process of finalising its new National Energy Plan (NEP) with the goal of achieving its long-term climate targets. The forthcoming NEP will integrate five key sub-plans, namely the Power Development Plan (PDP), the Alternative Energy Development Plan (AEDP), the Energy Efficiency Plan (EEP), the Gas Plan and the Oil Plan.

FIGURE 5
—
Overview of the institutional context of clean energy finance in Thailand



POLICY LANDSCAPE AND TRENDS

THAILAND'S CLEAN ENERGY FINANCE AND INVESTMENT LANDSCAPE

It is estimated that Thailand attracted over USD 11 billion of renewable energy investment from 2014 to 2023. Renewable energy investments in Thailand saw a peak in 2017, when they reached over USD 3 billion, and declined since then. Despite increases in renewable energy investments in Thailand from 2013 until 2017, outstanding overcapacity issues and barriers in the enabling environment might have hindered renewables investments in Thailand until today.

Thailand has a growing and vibrant green and sustainable finance market. Outstanding green, social, and sustainability bonds (GSS) in Thailand were worth USD 9.5 billion as of 2022, with private issuances leading the way and green bonds being the most common bond type. Most GSS bonds were issued in Thai baht, showing the maturity of the local currency bond market. However, the GSS bond market in Thailand remains relatively small, compared to the standard local currency bond market.

To facilitate the development of green, transition and sustainable finance products and avoid greenwashing, in 2023 the Thailand Taxonomy Board, composed of representatives of the Bank of Thailand the Securities and Exchange Commission, developed the first phase of a transition taxonomy to classify economic activities as green, amber or red, depending on their contribution to mitigation objectives.

ESTIMATES OF THE CLEAN ENERGY INVESTMENTS REQUIRED TO ACHIEVE THAILAND'S ENERGY PLANS

As part of the Roadmap, The Creagy developed a model to estimate the finance and investment needs for Thailand to reach the targets of its renewable energy and energy efficiency plans. It is estimated that the total investment in new renewable power during 2022-2037 will amount to THB 779 billion (USD 22 billion). Almost half of the investment required will be in solar PV (see Figure 6).

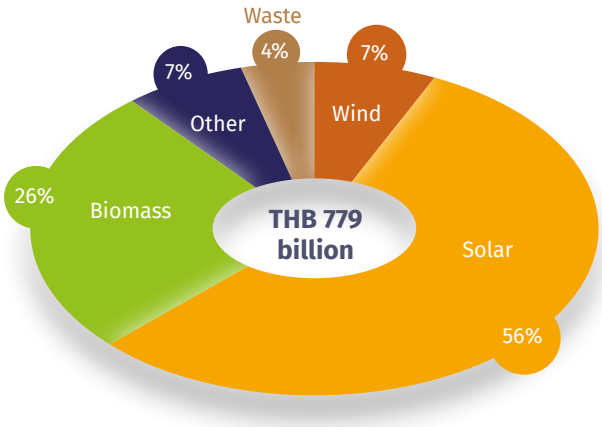


FIGURE 6
—
Estimated renewable energy investment needs from 2022 until 2037

Investment in energy efficiency improvements in industrial, commercial, residential and agricultural sectors is predicted to reach THB 974 billion (USD 28 billion) during 2022-2037. The industrial sector needs the largest investment of THB 420 billion (USD 12 billion), or 43% of the total energy efficiency investment (Figure 7).

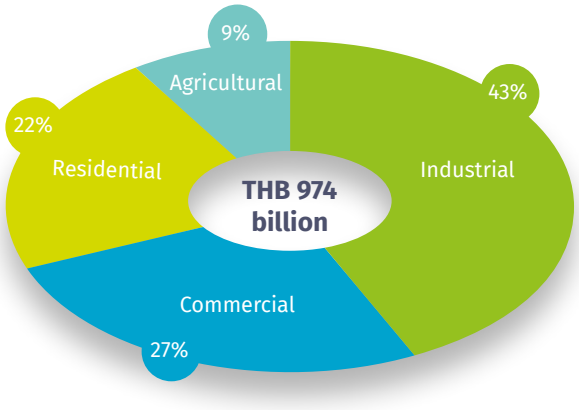


FIGURE 7
—
Estimated energy efficiency investment needs from 2022 until 2037

SMALL-SCALE RENEWABLE POWER

Deploying small-scale renewable energy in Thailand can provide considerable benefits in terms of development and energy access, especially to rural and remote areas across the country.

Small-scale installations bear significant advantages over large-scale projects. For example, rooftop solar projects are simpler to develop, build and operate than ground-mounted PV projects, they use space that would not be used otherwise and often protect roofing material.

OVERVIEW AND TRENDS TO DATE

- While Thailand has made important strides to deploy large-scale renewable power capacity over the past decade, significant progress remains needed to unlock financing for small-scale renewable power systems. Over 90% of installations are large-scale solar farms rather than rooftop solar projects.
- Over the last two decades, Thailand put in place a suite of feed-in-tariff (FiT) schemes to boost the development of renewables in Thailand's electricity sector, including that of small-scale sources.
- At present, rooftop solar PV installations for self-consumption are permitted for all electricity users. However, any excess electricity generated by the PV systems cannot be fed back into the power grid, with the exception of the net billing buyback pilot for residential solar which had limited turnout.

OUTSTANDING CHALLENGES AND FINANCING BARRIERS

Unlocking finance and investment for small-scale renewable power in Thailand faces outstanding barriers, linked to:

- **Financing,** including unfavourable conditions for existing renewable loan programmes for MSMEs, limited access to funding and expertise for micro-grids in remote, off-grid island communities, rising supply chain costs and high cost of debt for rooftop solar and other clean energy projects.
- **Policy and regulation,** such as policy uncertainty and limited predictability of energy policy planning, cumbersome and costly licensing and permitting procedures, inconsistent and challenging grid codes and regulations, lack of skilled staff and low enrolment in net-billing schemes.
- **Governance,** including lack of cross-ministerial co-ordination, overlapping responsibilities, and capacity and information gaps amongst MSMEs.

BUSINESS MODELS FOR SMALL-SCALE ROOFTOP SOLAR

Four main business models for rooftop solar emerged in Thailand (see Table 2):

- **Solar roof rental**
- **Solar power purchase agreement (PPA)**
- **Solar leasing**[1]
- **Community solar.**

1 • Solar leasing is considered both a business and a financing model. It can be considered a business model as it is structured to enable enterprise and customer value creation, but it is also a financing model, as it provides the capital needed for consumers to own a solar system.

SMALL-SCALE RENEWABLE POWER

Since these business models are still relatively recent, and given the discontinued FiT support, it is unclear which models will dominate the solar energy market in Thailand. Some of the business models, such as solar leasing and solar PPA, could further develop even without public support. In contrast, solar roof rental and community solar may require significant public support (such as through a FiT).

TABLE 2
—
Business models for rooftop solar emerging in Thailand: Key characteristics

Business model	Business structure	Driver	Barrier	Risk
Solar roof rental	**Scale:** Commercial **Ownership:** Developer **Customer benefit:** Rental fee **Customer cost:** None	• Roof owners benefit from rental fee and reduced heat absorption, leading to decreased power consumption. • Housing developers can increase revenues and value of their houses.	• Limited PPA quota programmes from the government.	• Risk of roof damage (for building owners). • Building use changes risks (for developers).
Solar PPA (or solar shared savings)	**Scale:** Commercial **Ownership:** Developer **Customer benefit:** Bill savings **Customer cost:** PPA electricity price < grid price	• Model shielded from policy support and uncertainty. • Economic attractiveness and bill savings from buying solar electricity instead of grid electricity. • The developer would cover O&M costs.	• Limited applicability in residential sector due to high investment costs.	• Risk of increase in electricity price. • Load pattern may change, affecting the amount of PPA. • Electricity needed (risk for building owners).
Solar leasing	**Scale:** All **Ownership:** Customer **Customer benefit:** Sale of electricity to the grid or bill savings **Customer cost:** Lease payment	• Interest from financial institutions with existing leasing products. • Avoidance of high upfront costs of solar systems for customers.	• Limited feasibility for small-scale systems. • Lack of a third-party registration system for solar system components (modules and inverters).	• Risk of non-payment from the lessee (lessor risk). • Uncertain yield/ performance from the solar system (lessee risk).
Community solar	**Scale:** Residential **Ownership:** Customer **Customer benefit:** Sale of electricity to the grid **Customer cost:** Principal and interest	• Strong neighbour networks. • Peer effects of adopting solar technology.	• Limited financing options for community residential customers.	• FiT sharing agreement deviations. • Unexpected yield/ performance from the solar system. • High community. co-ordination costs.

Promising financing mechanisms for small-scale renewable power

Potential financing models that could be explored in Thailand to de-risk small-scale renewable projects and attracting finance and investment towards them include:

- **Credit guarantee schemes targeted at MSMEs and small-scale renewable energy projects**

  They can help MSMEs access finance by transferring all or part of the borrower's credit and default risks, thus alleviating factors such as limited collateral and track record of MSMEs.

- **Aggregation and securitisation models for small-scale renewables**

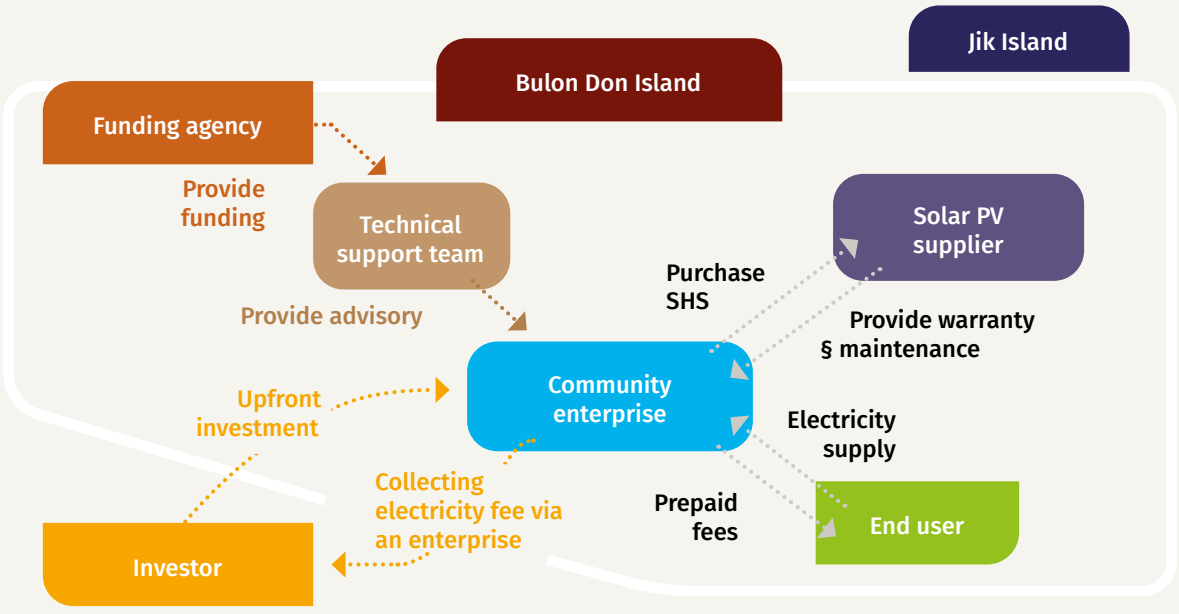
  They can allow the bundling and trenching of projects to reach a scale and risk profile that is attractive to investors.

- **Pay-as-you-go and community-owned models**

  They can ease access to clean energy to off-grid communities at affordable costs, using mobile payment technologies to facilitate payment by instalments (see Box 1).

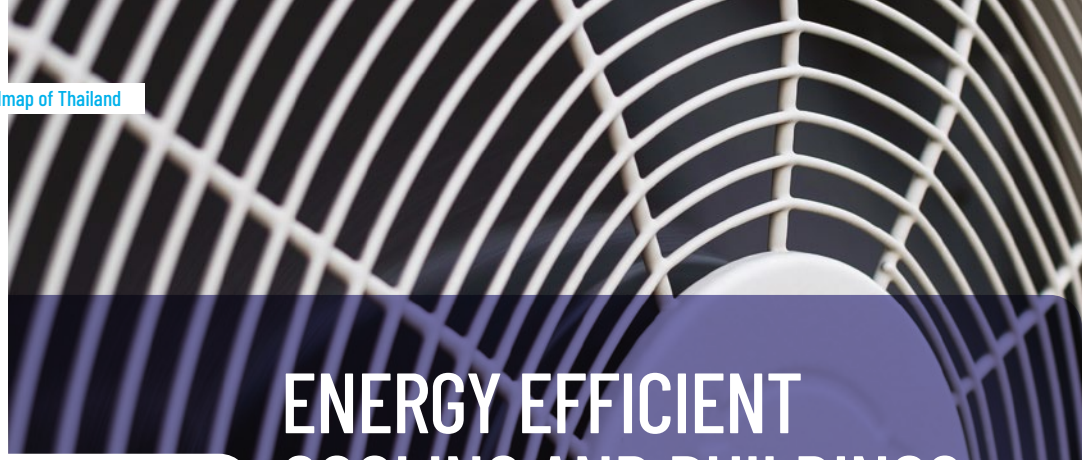
BOX 1 — Pay-as-you-go (PAYG) pilots in Thailand

FIGURE 8



In Thailand, a pilot community-owned PAYG model was launched in 2017 through a collaborative effort between the Ministry of Energy, GIZ Thailand and the social enterprise ReCharge Energy, aiming to develop sustainable electrification using solar home systems (SHS). The targeted areas include two off-grid islands in the Gulf of Thailand and the Andaman Sea, which currently rely on electricity generated by diesel engines: Bulon Don Island and Jik Island.

On the island of Bulon Don, the programme provided three different packages of solar home systems, operationalised and maintained by a local community enterprise through a revolving fund. A PAYG model was set up as a digital pre-payment scheme consisting of monthly instalments. On Jik Island, a private, community-owned hybrid renewable energy mini-grid was upgraded thanks to private equity investments, grants and technical assistance by development partners and the government.



ENERGY EFFICIENT COOLING AND BUILDINGS

Demand for cooling in Thailand is increasing as incomes are increasing, tourism is booming and temperatures are rising. Unlocking financing for energy efficient public and commercial buildings and cooling appliances is a priority for Thailand, as the building sector represented on average approximately 25% of the total electricity consumed in Thailand in 2019. Furthermore, cooling made up for over half of the Thai commercial building sector's electricity consumption and 20% of its GHG emissions.

OVERVIEW AND TRENDS TO DATE

- Thailand has a large air conditioning manufacturing industry with a deep local supply chain and an export-driven model. While there is increasing interest in efficient cooling strategies through green building design and district cooling, refrigerant-based AC systems remain the most accessible option to achieve thermal comfort in buildings.
- Commercial and public buildings are seeing increasing electricity demand, with shopping malls having the highest energy intensity among commercial buildings.
- ESCOs are key players in Thailand's energy efficiency financing landscape and Thailand's ESCO market is dynamic and fast-growing. Thailand is one of the countries with the highest presence of private companies among ESCOs' client base, as nearly all Thai ESCOs generate their revenues from private clients.
- The dominant ESCO business model in Thailand is the EPC guaranteed savings model, an on-balance-sheet contractual agreement whereby the ESCO guarantees a certain savings on the client's energy bill.

POLICIES AND REGULATIONS

- The Government of Thailand set a 20-year Energy Efficiency Plan (EEP) which aims to reduce energy intensity by 30% by 2037, compared to 2010 levels. Within the EEP, the commercial sector is expected to account for the largest share of energy efficiency improvements (41%).
- While Thailand has had a building energy code (BEC) in place since 2009, in 2021 building energy codes became binding on state agency buildings to promote energy efficient design and construction. From 2023 onwards, new buildings larger than 2000 m^2, are required to achieve the BEC energy standard as a minimum requirement in the approval process.
- Thailand has minimum Energy Performance Standards (MEPS) for room air conditioners as well as a labelling system to categorise products based on their energy-saving performance.

MARKET CHALLENGES AND BARRIERS

Several financing barriers and regulatory challenges remain for Thailand to unlock investment in energy efficiency:

- Most ESCOs are small in size and face challenges in accessing finance for energy efficiency projects. Many ESCOs in Thailand also have low capitalisation and can thus offer low collateral to banks.
- Many commercial banks are not familiar with energy efficiency technologies and ESCO's business model and thus often find it challenging to evaluate revenue streams or cash flows derived from energy savings.
- The ESCO and Energy Efficiency Revolving Funds established by the government helped to increase the familiarity of banks with renewable energy projects but most of the projects financed under those funds tended to be large projects, with financing channelled mainly from a few large Thai commercial banks.
- Institutional co-ordination remains a challenge for effectively enforcing and promoting energy efficient standards in Thailand.
- Solar PV could contribute to meeting rising energy demand for cooling with clean energy produced on-site. However, limited space on rooftops and low solar irradiance during the rainy season can pose challenges.

PROMISING FINANCING MECHANISMS FOR ENERGY EFFICIENT BUILDINGS AND COOLING APPLIANCES

Potential financing models that could be explored in Thailand to de-risk energy efficient investments include:

- Energy savings insurance (ESI)

  Through ESI, ESCOs can back their contractual guarantees for the performance of their products and clients can be assured of compensation in case the projected energy savings are not realised.

- Green bonds for buildings

  They can be useful instruments to raise financing from capital markets for large-scale building projects, backed by credible and verified green building certifications.

- On-bill financing (OBF)

  OBF programs help customers invest in energy efficiency improvements, yielding mutual advantages like lowered energy bills and enhanced property values.

- Bulk procurement for energy-efficient appliances

  It harnesses economies of scale, achieves cost savings and operational efficiency and manages repayment risks while encouraging manufacturers to innovate and produce more competitive and energy efficient products.

- Energy Efficient Technology Lists (EETL)

  EETLs would list high-performing appliances and solution providers that have been pre-approved as eligible for financing from partnering financial institutions.

Several of these financing mechanisms are applicable to both energy efficient buildings and energy efficient appliances, which go hand-in-hand as enhancing building efficiency would reduce active energy needs.

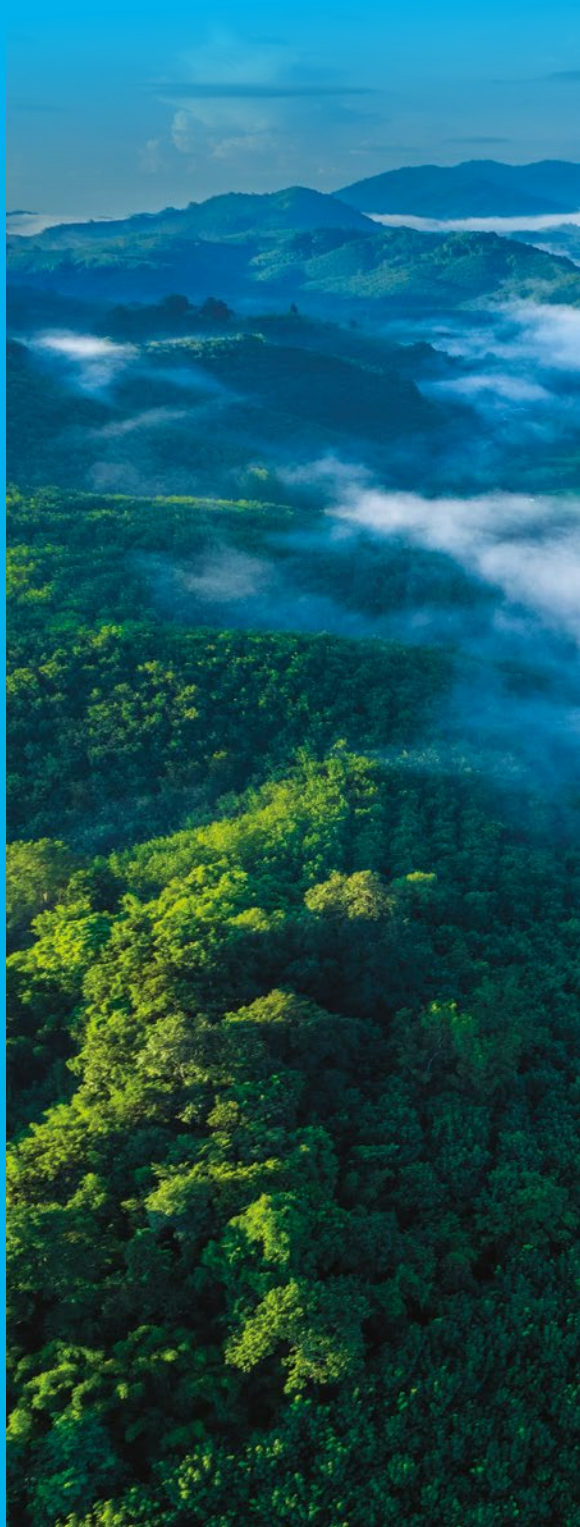
These Policy Highlights are based on the OECD publication:

Clean Energy Finance and Investment Roadmap of Thailand.

Thailand has adopted ambitious clean energy targets to meet its long-term climate goals, committing to reach carbon neutrality by 2050 and net zero greenhouse gas (GHG) emissions by 2065. Transforming Thailand's energy system, alongside broader development objectives, is critical to meeting these goals as the energy sector accounts for 69% of Thailand's total GHG emissions.

The Clean Energy Finance and Investment Roadmap of Thailand ("the Roadmap") outlines key actions to unlock finance and investment in two clean energy sectors: (i) renewable power, with special attention to small-scale renewable power systems; and (ii) energy efficiency in buildings, with a focus on cooling applications. The two sectors were selected in close consultation with the Department of Alternative Energy Development and Efficiency (DEDE) of the Ministry of Energy of Thailand. The Roadmap provides a comprehensive overview of the progress to date, policy context and challenges to mobilise near-term finance in those sectors, as well as estimates of the finance needs to reach Thailand's clean energy plans. The report also includes a roadmap action plan, suggesting non-prescriptive recommendations and actions that the Government of Thailand, financial institutions, energy service companies, academia and the international development community active in the country could undertake to foster clean energy investments in Thailand.

https://doi.org/10.1787/d0cd6ffc-en



The Roadmap was developed as part of the OECD Clean Energy Finance and Investment Mobilisation (CEFIM) Programme with support from the Government of Denmark.

Visit www.oecd.org/cefim for ongoing insights into CEFIM programme activities and events.

CEFIM
CLEAN ENERGY FINANCE & INVESTMENT MOBILISATION

CONTACT DETAILS

Geraldine Ang
CEFIM Team Lead
Geraldine.Ang@oecd.org

—

Valentina Bellesi
Policy Analyst
Valentina.Bellesi@oecd.org

OECD

www.oecd.org/cefim/Thailand