THAILAND TAXONOMY

Introduction

Conceptual Framework and Methodological Approach

July 2025

THAILAND TAXONOMY BOARD

Thailand Taxonomy Board

The Thailand Taxonomy Board is established to develop Thailand Taxonomy, a classification system of economic activities deemed as environmentally-sustainable. The Board comprises agencies from both the public and private sectors as well as financial sector to ensure all sectors' views are reflected. The list of agencies is as follows:

1. Department of Climate Change and Environment (DCCE), Ministry of Natural Resources and Environment
2. Bank of Thailand (BOT)[1]
3. The Securities and Exchange Commission, Thailand (SEC)[1]
4. Stock Exchange of Thailand (SET)[1]
5. Department of Alternative Energy Development and Efficiency, Ministry of Energy
6. Thailand Greenhouse Gas Management Organisation (Public Organisation)
7. Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resource and Environment
8. Energy Policy and Planning Office, Ministry of Energy
9. Office of Transport and Traffic Policy and Planning, Ministry of Transport
10. Department of Agriculture, Ministry of Agriculture and Cooperatives
11. Office of Agricultural Economics, Ministry of Agriculture and Cooperatives
12. Rice Department, Ministry of Agriculture and Cooperatives
13. Department of Livestock Development, Ministry of Agriculture and Cooperatives
14. Royal Forest Department, Ministry of Natural Resources and Environment
15. Department of National Parks, Wildlife and Plant Conservation, Ministry of Natural Resources and Environment
16. Department of Fisheries, Ministry of Agriculture and Cooperatives
17. Department of Marine and Coastal Resources, Ministry of Natural Resources and Environment
18. Department of Public Works and Town & Country Planning, Ministry of Interior
19. Department of Industrial Works, Ministry of Industry

[1] the BOT, SEC, and SET are representatives of the Working Group on Sustainable Finance (WG-SF), in collaboration with the Fiscal Policy Office (FPO) and the Office of Insurance Commission (OIC).

20. Thai Industrial Standards Institute, Ministry of Industry
21. Pollution Control Department, Ministry of Natural Resources and Environment
22. Department of Local Administration, Ministry of Interior
23. Energy Regulatory Commission
24. Bangkok Metropolitan Administration
25. Department of Health, Ministry of Public Health
26. Wastewater Management Authority, Ministry of Interior
27. Federation of Thai Industries
28. Renewable Energy Industry Club, Federation of Thai Industries
29. Thai Chamber of Commerce and Board of Trade of Thailand
30. Thai ESCO Association
31. Council of Engineers
32. Thai Condominium Association
33. Thai Green Building Institute
34. Industrial Estate Authority of Thailand
35. The Thai Bankers' Association (TBA)
36. Association of International Bank (Thailand) (AIB)
37. Government Financial Institutions Association (GFA)

In addition, Thailand Taxonomy was developed with the support of the International Financial Corporation (IFC), Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), and the Asian Development Bank (ADB). Meanwhile, various international and local consultants served as technical advisors during the development, including the Climate Bonds Initiative (CBI), DNV, the Creagy, the Carbon Institute for Sustainability (CBiS), and the Thailand Development Research Institute Foundation (TDRI).

More importantly, inclusive collaboration across various parties, including academia, industry associations, NGOs, and international organisations, helps to ensure that the Thailand Taxonomy aligns with international standards while reflecting the national context. Views and feedback, even from those not formally on the Thailand Taxonomy Board, also contributed significantly to the successful completion and future implementation of the Thailand Taxonomy.

Thailand Taxonomy Methodological Summary

This section provides a brief description of the methodology for developing the Thailand Taxonomy and the basic principles of its use.

Objectives of the Thailand Taxonomy

Based on an analysis of Thailand's national plans, strategies and policies, the following taxonomy objectives were identified:

1. Climate change mitigation;
2. Climate change adaptation;
3. Sustainable use and protection of marine and water resources;
4. Promotion of resource resilience and transition to a circular economy;
5. Pollution prevention and control;
6. Protection and restoration of biodiversity and ecosystems.

Selection of the activities for the inclusion into the Taxonomy

The Taxonomy is structured and designed to improve the ecological and climate credentials of the economy, and activities within each sector are selected on the basis of the following:

- **Substantial contribution** to the environmental objectives of the Taxonomy specified for each sector.
- **Existence of technological solutions for decarbonisation** for some climate-material activities, no such solution has yet been developed.
- **Inclusion into other taxonomies** to avoid global green market fragmentation and utilize research put into their development.

In addition, climate-material activities are selected on the basis of the ISIC (version 4) classification system. It is an international classification system of economic activities that has been adopted by the majority of other taxonomies as a common framework. Mapping against other types of classification (including TSIC) is included in the Thailand Taxonomy.

Although the economic materiality of certain activities is presented in this report, it does not serve as the primary criteria for the activity selection. This is because some economically significant activities may not, in themselves, exhibit direct climate materiality.

Classification of Activities

1. Traffic Light System

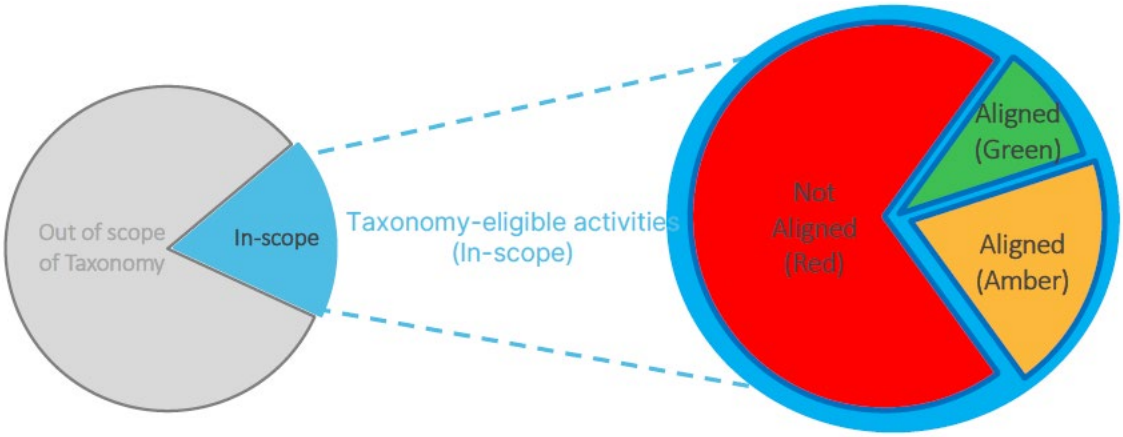
Thailand Taxonomy introduces a "traffic light system" classification—green, amber (transitional), and red—offering a more effective approach to evaluating economic activities. Unlike traditional binary taxonomies that categorize activities as either sustainable (green) or unsustainable (red), the traffic light system allows a greater flexibility and a broader range of pathways for decarbonizing the economy, thereby providing greater opportunities for funding access.

Traffic light	Description
Green	Substantially contributing to the goals of the taxonomy. This category includes: ● **Near zero activities**: activities already at or near net-zero emissions that may require some further decarbonisation but not a significant transition (e.g., solar or wind power generation or operation of electric fleet-based transportation services); ● **Clear pathway to zero activities**: activities that are not net-zero at the moment but have a clear Paris Agreement aligned decarbonisation pathway (e.g., shipping) that may be followed. This category can generally be applied to new facilities operating in compliance with the requirements of the taxonomy (e.g., construction of a steel mill producing steel in compliance with the green category for steel production) or to revenue that is generated through the sale of products that meet the requirements of the taxonomy.
Amber	This category includes activities that entail relatively high emissions but are: ● Facilitating significant emissions reductions in the short term with reliable decarbonisation pathways and prescribed sunset dates (2040 for Thailand Taxonomy); ● Enabling other green activities, even though they are not green themselves (e.g., grid infrastructure).

Traffic light	Description
	Thailand's national decarbonisation strategies and Nationally Determined Contribution (NDC) were taken into account when developing criteria for this category. Amber activities may have the criteria in the form of: ● **decarbonisation pathway** (e.g. in the energy sector) that the activity must follow in order to be considered transitional. In order to attract transition financing, the changes implemented in the enterprise must lead to a decrease in the emission intensity according to this pathway. ● **relative performance improvement requirements** (e.g. in the construction and real estate sector). This format involves the introduction of a certain percentage of improvement over the baseline that must be achieved in order for the financing raised this way to be considered transition financing. ● **list of applicable measures** (e.g. in the Manufacturing sector) which refer to the individual technologies that can be applied to improve the climate and environmental credentials of the activity. Funds raised for the implementation of these measures will be considered transition funding. If this category features N/A, it means that no transitional option is available, and only green category is available to those who want to align their activity of this kind with the Taxonomy.
Red	Currently not compatible with net-zero trajectory and are not going to become compatible anytime soon. These activities should therefore be phased out (e.g., electricity generation from coal) if the country wants to achieve the goals of the Paris Agreement. If this category features N/A, it means the activity cannot deal significant damage to the environment and thus all activities of this type that are not aligned with green or amber category are simply out of scope of the taxonomy.
Out of the scope of the taxonomy	If the activity is not present in the taxonomy, it does not mean that this activity is harmful to its objectives. It is simply considered "out of the scope" due to its low climate materiality or lack of science-based criteria. The taxonomy does not make any decision about it, and it should be reported in disclosure documents as "out of scope".

However, development of the agricultural taxonomy employs a practice-based approach due to data limitations in directly measuring greenhouse gas (GHG) emissions. This method relies on internationally recognized best practices that are widely accepted for their effectiveness in reducing GHG emissions within the agricultural sector.

Figure 1 Example of Activity Classification under the Taxonomy



Source: The Creagy

2. **Essential criteria**

The principles of **Do No Significant Harm (DNSH)** and **Minimum Social Safeguards (MSS)** serve as the essential criteria within the Thailand Taxonomy framework. DNSH ensures that economic activities do not adversely impact other environmental objectives, while MSS aims to prevent negative social consequences. These principles are essential to maintaining the integrity of the taxonomy and mitigating risks such as greenwashing.

In cases where an activity does not meet these principles, the responsible entity must develop and implement a remediation plan that has undergone evaluation against relevant standards, includes stakeholder consultation, and ensures public disclosure. The plan must be fully executed within a three-year timeframe. If the activity fails to achieve compliance within this timeframe, it will result in the activity being reclassified as non-compliant (red category).

It is very important to note that all entities adhere to the applicable legal and regulatory frameworks of Thailand or the jurisdiction in which the activity is conducted, as a prerequisite for alignment with the taxonomy.

The implications of aligning capital expenditures, revenue, or financial instruments with the Taxonomy

The most popular use of taxonomies worldwide is to evaluate various financial flows for alignment with it. Any business can be divided into various economic activities in accordance with the ISIC classification (this is why activity serves as the basis for the Taxonomy). Each of these activities can either generate revenue, or financial instruments can be issued with their backing, or it can be changed in some way with the help of capital expenditures:

- **Capital expenditure**, refers to the money an entity raises through debt instruments (bonds, loans) and that is used to buy, maintain, or improve its fixed assets. By meeting the relevant Taxonomy criteria, entities can issue Taxonomy-aligned[2] green- or transition-labelled bonds or loans to raise sustainable financing for Taxonomy-eligible[3] activities.
- **Revenue** refers to the total income of an organisation or corporate entity that is derived from the sale of products or services. By meeting the relevant Taxonomy criteria, corporates can report and disclose the proportion of business that is aligned with green or transition as defined by the Taxonomy. The products that are produced through the Taxonomy-aligned activities can also be considered Taxonomy-aligned.
- **Financial instruments** can be aligned with the Taxonomy if they are derived from a business whose revenue aligns with the Taxonomy. In this case, the financial instrument can be called “green” or “amber (transitional)”, depending on the revenue alignment category.

Please note that these are general application rules, and more detailed guidance must be provided separately by relevant national authorities.

Living Document

Thailand Taxonomy is designed as a living document, subject to review every 3–5 years. Earlier revisions may be undertaken in response to significant technological advancements or newly available data that impact its criteria and thresholds, ensuring continued alignment with evolving scientific knowledge, innovation, and policy developments.

[2] “Aligned” means that the activity in question is fully compliant with all relevant criteria of the taxonomy.

[3] “Eligible” refers to the activities that are included in the taxonomy without assessing their compliance with the criteria.

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List of abbreviations

ADB	Asian Development Bank
AER	Annual Efficiency Ratio
ANDBI	Activities Not Defined by ISIC
ASEAN	Association of Southeast Asian Nations
ATTRIC	Automotive and Tyre Testing, Research, and Innovation Center
AWD	Alternative wetting and drying
BAU	Business-as-usual
BEC	Building Energy Code
BF	Blast furnace
BF-BOF	Blast furnace – basic oxygen furnace
BOT	Bank of Thailand
BUR4	Thailand's Fourth Biennial Update Report
CapEx	Capital expenditure
CBAM	Carbon border adjustment mechanism
CCAPA	Climate Change Action Plan for Thai Agriculture
CCMP	Climate Change Master Plan
CCS/CCUS	Carbon capture and storage/ Carbon capture, utilisation and storage
CHP	Combined heat and power
CRVA	Climate risk vulnerability assessment
CSP	Concentrated solar power
DCCE	Department of Climate Change and Environment
DCS	Fuel Oil Data Collection System
DEDE	Department of Alternative Energy Development and Efficiency
DIW	Department of Industrial Works
DRI	Direct reduced iron
DSR	Direct dry rice seeding
EAF	Electric arc furnace
EDGE	Excellence in Design for Greater Efficiencies
EU	European Union

EUI	Energy use intensity
FDI	Foreign direct investments
FSC	Forest Stewardship Council
FTI	Federation of Thai Industries
GBCA	Green Building Council Australia
GDP	Gross domestic product
GFA	Gross floor area
GHG	Greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GWP	Global warming potential
HDPE	High-density polyethylene
ICMA	International Capital Market Association
IEA	International Energy Agency
IFMP	Integrated Farm Management Plan
IFC	International Finance Corporation
IFMP	Integrated Farm Management Plan
IGBC	Indian Green Building Council
IMO	International Maritime Organisation
IPCC	Intergovernmental Panel on Climate Change
IPHE	International Partnership for Hydrogen and Fuel Cells in the Economy
IPPU	Industrial processes and products use
IRENA	International Renewable Energy Agency
ISIC	International Standard Industrial Classification
ISO	International Organisation for Standardization
LCA	Life cycle analysis
LDPE	Low density polyethylene
LEED	Leadership in Energy and Environmental Design
LLDPE	Linear low-density polyethylene
LPG	Liquefied petroleum gas
LT-LEDS	Long-Term Low Emissions and Development Strategy
LULUCF	Land use, land-use change, and forestry

MEPS	Minimum Energy Performance Standard
MOE	Ministry of Energy
MIND	Ministry of Industry
MOT	Ministry of Transport
MOU	Memorandum of understanding
MRV	Monitoring, reporting and verification
NDC	Nationally Determined Contribution
NESDC	National Economic and Social Development Council
OpEx	Operating expenditure
PED	Primary energy demand
PEFC	Programme for the Endorsement of Forest Certification
PET	Polyethylene terephthalate
PM 2.5	Particulate matter 2.5
PP	Polypropylene
PW	Photovoltaic
QoQ	Quarter-on-Quarter
RCP	Representative Concentration Pathway, a greenhouse gas concentration trajectory adopted by the IPCC
SCM	Substitute cementitious material
SDG	Sustainable Development Goals
SEC	Securities and Exchange Commission
SET	Stock Exchange of Thailand
TCMA	Thailand Cement Manufacturers Association
TPI	Transition Pathway Initiative
TTB	Thailand Taxonomy Board
TEI	Thailand Environment Institute
TFCC	Thai Forest Certification Council
TSIC	Thailand Standard Industrial Classification
WG-SF	Working Group on Sustainable Finance
XRD	X-ray diffraction
YoY	Year-on-year

ZEV	Zero emission vehicles

List of Metrics Abbreviations

CO2e/kWh	Greenhouse gas emission intensity calculated as amount of greenhouse gases in carbon dioxide equivalent per kilowatt hour
EJ/year	Energy consumption calculated as exajoules consumed per year
GgCO2eq	Gigagrams of carbon dioxide equivalent, Greenhouse gases in carbon dioxide equivalent
ktoe	Thousand tons of oil equivalent
Mha	Megahectare
MtCO2e/year	Gross emission calculated as metric tons of carbon dioxide equivalent emitted per year
MW	Megawatt
pkm or p-km	passenger-kilometre is the unit of measurement representing the transport of one passenger by a defined mode of transport (road, rail, air, sea, inland waterways etc.) over one kilometre
RTK	Revenue-tonne-kilometre, measures how much revenue a company makes per volume of freight transported
tkm or t-km	tonne-kilometre is a unit of measure of freight transport which represents the transport of one tonne of goods by a given transport mode (road, rail, air, sea, inland waterways, pipeline etc.) over a distance of one kilometre

1. Thailand Taxonomy Development Project Background

The Working Group on Sustainable Finance (WG-SF), consisting of the Fiscal Policy Office (FPO), the Bank of Thailand (BOT), the Securities and Exchange Commission (SEC), the Office of Insurance Commission (OIC), and the Stock Exchange of Thailand (SET), has joined forces to steer and align the direction of Thailand's sustainable finance policies to support the country's development objectives. Developing a practical national sustainable finance taxonomy to promote inward investment flows across Thailand's financial sectors from domestic and international investors is one of the key strategic initiatives identified by the Thailand Sustainable Finance Initiatives Roadmap published in 2021.[4] A well-defined and structured taxonomy is intended to support better-informed and more efficient decision-making and responses to investment opportunities that contribute to achieving national climate development objectives as defined by the Government of Thailand.

As an institution leading the Thailand Taxonomy (hereinafter – the Taxonomy) development process, the Thailand Taxonomy Board defined the following list of objectives for the Taxonomy document:

1. To provide a standard practice to the financial sector and other related sectors;
2. To enable data disclosure and encourage financial institutions and other sectors to integrate environment-related risks and opportunities into their operations by providing incentives;
3. To provide alignment with internationally recognized taxonomies such as ASEAN Taxonomy, EU Taxonomy, Singapore Taxonomy and Climate Bonds Taxonomy.

In June 2023, the Thailand Taxonomy Board launched the Thailand Taxonomy Phase I as a reference tool for standardized classification of economic activities deemed low-carbon and climate-friendly. While recognizing multiple priority environmental objectives for Thailand, the Thailand Taxonomy Phase I develops a classification system for the objective of climate change mitigation (i.e., the reduction of greenhouse gas (GHG) emissions) and covers economic activities in energy and transportation sectors, which are the two economic sectors that contribute the highest proportions of Thailand's total GHG emissions. The Thailand Taxonomy

[4] Bank of Thailand [BOT], "Joint Statement Sustainable Finance Initiatives for Thailand," Press release, August 18, 2021, https://www.bot.or.th/en/news-and-media/news/news-20210818.html.

Phase I was developed with the support of the International Financial Corporation (IFC), with Climate Bonds Initiative as the technical advisor.

In May 2025, the Thailand Taxonomy Board for Phase II - co-led by Department of Climate Change and Environment (DCCE), BOT, SEC, and SET - launched the Thailand Taxonomy Phase II. This phase marks a significant expansion, incorporating four additional sectors that are critical to achieving the country's environmental objectives: agriculture (including forestry), construction and real estate, manufacturing, and waste management.

2. Thailand General Climate Policy Background

Thailand has progressively strengthened its climate commitments under the United Nations Framework Convention on Climate Change (UNFCCC). The country submitted its first Nationally Determined Contribution (NDC) in 2016, committing to a 20% reduction in greenhouse gas (GHG) emissions from the projected business-as-usual (BAU) level by 2030, with the potential to increase this to 25% conditional on international support.

The First Updated NDC (2020) emphasized the need for financial and technical support, particularly in the energy sector. This was operationalized through the NDC Roadmap on Mitigation (2021–2030) and the NDC Action Plan.

In 2021, Thailand submitted its Long-Term Low Greenhouse Gas Emission Development Strategy (LT-LEDS), aiming to peak GHG emissions by 2030, achieve carbon neutrality by 2065[5], and move toward net-zero emissions in the latter half of the century. At COP26 in Glasgow, the Prime Minister announced an enhanced target of carbon neutrality by 2050 and reaffirmed the net-zero goal by 2065, with the potential to raise emission reductions to 40% by 2030, contingent on adequate international support[6].

In November 2022, Thailand Second Updated NDC[7] and the revised LT-LEDs[8], committing to a 30% GHG reduction by 2030, with an enhanced ambition of up to 40% under favorable conditions. The revised LT-LEDS outlines key mitigation strategies, including a significant scale-up of renewable energy deployment. According to the draft National Energy Plan, at least 50% of new power generation will be renewable by 2050, with solar and wind projected to contribute 65% of total electricity generation by 2060.

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[5] Office of Natural Resources and Environmental Policy and Planning [ONEP] and Climate Change Management and Coordination division [CCMP], "Mid-century, Long-term Low Greenhouse Gas Emission Development Strategy THAILAND," UNFCCC (MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT, October 2021, https://unfccc.int/sites/default/files/resource/Thailand_LTS1.pdf.

[6] Mintra Adair, "Thailand Vows to Reach Net Zero Carbon Emissions by 2065 at COP26," Thai PBS World, November 2, 2021, https://www.thaipbsworld.com/thailand-vows-to-reach-net-zero-carbon-emissions-by-2065-at-cop26/.

[7] Office of Natural Resources and Environmental Policy and Planning [ONEP], "Thailand's 2nd Updated Nationally Determined Contribution," UNFCCC NDC Registry, September 2, 2022, https://unfccc.int/sites/default/files/NDC/2022-11/Thailand%202nd%20Updated%20NDC.pdf.

[8] 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

To fulfil country's commitments, Thailand established the Department of Climate Change and Environment (DCCE) in August 2023. This dedicated department will lead the country's efforts in responding to climate change and implementing necessary measures. In March 2025, the DCCE presented the research, targets, strategies, and measures for Thailand's GHG reduction under its Third Updated NDC, "NDC 3.0", also referred to as Thailand's Second GHG Reduction Target. This updated version shifts from a BAU model to an absolute emissions reduction target, using 2019 as the base year. As a result, this enhanced target applies across all economic sectors and aims to limit Thailand's net GHG emissions to 152 million tonnes of CO_2 equivalent ($MtCO_2e$) by 2035, with at least 118 $MtCO_2e$ expected to be absorbed through forestry and land use (LULUCF). The domestic mitigation efforts (unconditional target) are expected to reduce emissions by 76.4 $MtCO_2e$, while an additional 32.8 $MtCO_2e$ reduction is anticipated through international support (conditional target), totaling 109.2 $MtCO_2e$ in reductions. With full support, this would represent a 60% reduction from 2019 levels, potentially aligning Thailand with a pathway to limit global temperature rise to 1.5°C. Thailand plans to submit NDC 3.0 to the UNFCCC Secretariat by September 2025, ahead of 30th Conference of the Parties (COP30) in November 2025.[9]

Thailand is also in the process of developing its first Climate Change Act, which aims to increase the efficiency of climate change mitigation and adaptation actions and facilitate the transition to a net zero economy. Some of the key elements of the draft Climate Change Act are the provisions on mandatory GHG reporting at the corporate level, the application of carbon pricing mechanisms such as the Emission Trading Scheme (ETS) and carbon tax, and the use of Thailand Taxonomy as a reference tool for various contexts. It is expected that the Act will be enacted within 2025.

[9] DCCE, "DCCE has a public hearing on the 'NDC3.0' target for reducing GHG emissions to 109.2 million tons of CO2 equivalent by 2035", March 2025, https://www.dcce.go.th/4537/

3. Thailand Taxonomy Development Framework

3.1 The rationale for the development of a national taxonomy

Given the importance of private and public finance to combat the challenges of climate change, creating and transitioning to a dedicated green finance taxonomy is catalytic to a more vigorous and effective sustainable finance sector. A taxonomy aims to provide a common framework for classifying economic activities to enable stakeholders to gather investment information and mobilise green financing. Taxonomies help market participants, regulators, and policymakers understand risk management and promote investments that meet robust sustainability goals. This increases the level of transparency in financial market priorities and could give a government a tool to direct capital flows in the desired direction that delivers measurable environmental, social and governance (ESG) benefits and net zero emission target.

Taxonomies also facilitate the development of sustainable finance products, including green bonds, green loans, green asset-backed securities, and green indices. A granular taxonomy also allows investors and state authorities to measure the degree of decarbonisation of the different sectors of the economy, the efficiency of their investments, and to identify related weak spots.

In particular, this taxonomy is a multipurpose tool that can be used for a variety of objectives. These could include:

- **To steer the market and provide guidance, frameworks and standards for investors and stakeholders**. It helps to avoid greenwashing and to increase capital flows to green projects as more and more people and institutions want their investments to be sustainable. It can also use to provide better clarity when complying with other frameworks such as the Taskforce on Climate-Related Financial Disclosures (TCFD) Recommendations.
- **To attract international climate-oriented capital**. A national taxonomy which is compatible with international standards and other recognized taxonomies can increase investment flow into that country and improve conditions for domestic borrowers operating on global markets.
- **To enable and harmonize data disclosure**. As the Taxonomy is adopted by intermediaries, it will be possible to benchmark the share of green investments in

portfolios of banks, insurance companies, and non-financial entities, with a consistent set of nomenclature.

- **To assess environmental risks and risk mitigation options.** Compliance with the taxonomy criteria can provide valuable information on climate-related risks for risk assessment specialists within the financial sector.
- **To modulate state policy in the desired manner**. Under the Paris Agreement and Nationally Determined Contribution (NDC), Thailand is committed to mitigating its GHG emissions. The Taxonomy provides the government with a tool to define target activities and develop support policies to achieve the country's emission reduction goals.
- **To serve as a basis for data collection**. Granular taxonomies are a valuable tool for understanding the situation in the economy related to GHG emissions and climate action.

3.2 The world of green taxonomies

The concept of green taxonomy was introduced in 2012 by the CBI as a voluntary guideline for the green bond market[10]. The taxonomy concept has since evolved from a voluntary market-led tool to a one that is increasingly led by governments. Currently, over 20 jurisdictions have or are in the process of establishing a green or sustainable finance taxonomy or similar classification scheme[11]. These include the European Union (EU)[12], ASEAN[13], China[14], Singapore[15] and many others. The EU, Climate Bonds and ASEAN taxonomies usually serve as benchmarks with countries and regions adjusting their respective national schemes to be compatible with them.

[10] Climate Bonds Initiative. (2023). Climate Bonds Taxonomy

[11] Climate Bonds Initiative. (2022). Global Green Taxonomy Development, Alignment, and Implementation

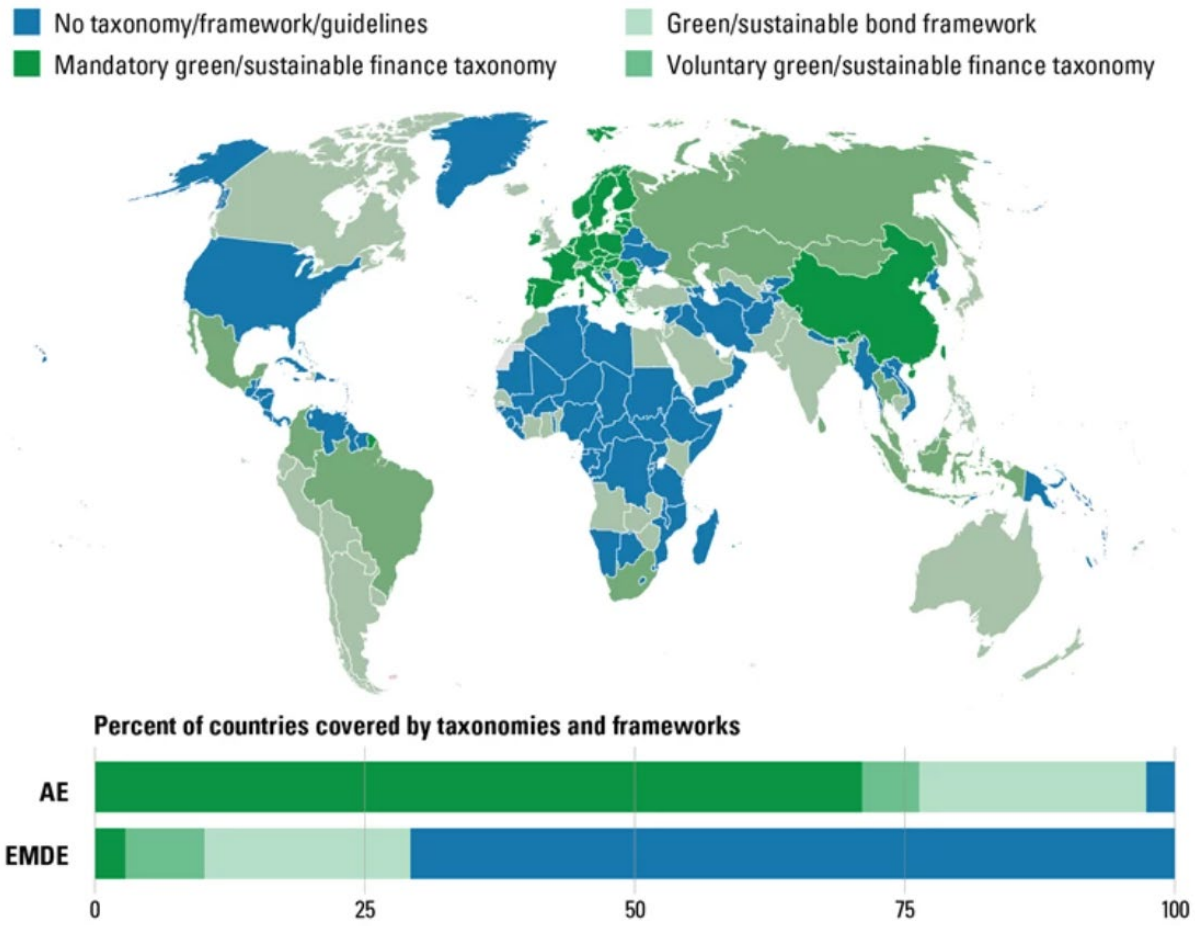
[12] European Commission. EU Taxonomy Navigator

[13] ASEAN Taxonomy Board. (2021). ASEAN Taxonomy for Sustainable Finance Version 1

[14] Climate Cooperation China. (2020). Green Bond Endorsed Project Catalogue (2020 Edition)

[15] Monetary Authority of Singapore. (2023). Singapore-Asia Taxonomy for Sustainable Finance

Figure 2 Countries covered by Taxonomy and green/sustainable frameworks



Source: Finance & Prosperity (World Bank 2024)

As the taxonomies around the world multiple, there are concerns of market fragmentation. Capital from all over the world is critical to achieving climate goals, but discrepancies between taxonomies may confuse investors and disincentivise cross-border capital flows. To avoid this, efforts are being made to harmonise compliant assets and metrics covered by the different taxonomies across jurisdictions. The most prominent attempt in this sphere has been the development of a Common Ground Taxonomy between (1) the EU and China and (2) the EU, China, and Singapore by the International Platform on Sustainable Finance (IPSF).

A key feature of taxonomies is the criteria used to identify green activities and separate them from non-green activities. Globally, there are three different methods used to define green:

- **Whitelist-based taxonomies**, which identify compliant projects or economic activities under each sector or sub-sector such as China, Russia, and Mongolia

- **Technical screening criteria-based taxonomies**, which define quantitative thresholds and screening criteria for economic activities and their compliance with the specific objectives such as EU, Colombia, South Africa, ASEAN, and Singapore
- **Principle-based taxonomies**, which define a set of core principles for the market without specifying compliant activities or thresholds such as Malaysia, ICMA, and ASEAN

In this context, the ASEAN Taxonomy for Sustainable Finance (ASEAN Taxonomy), with which the Thailand Taxonomy is closely aligned, is being developed as a two-tier set of principles of sustainable development and a reference point for sustainable projects and activities in ASEAN. Its goal is to help issuers and investors understand the sustainability impact of a project or economic activity. The ASEAN Taxonomy is meant to serve as an overarching guide to introduce a common language across the different jurisdictions to communicate and coordinate the labelling for economic activities and financial instruments.

3.3 Key reference taxonomies

There are four key reference taxonomies that serve as the foundation for developing the Thailand Taxonomy.

1. EU Taxonomy

The EU Taxonomy has emerged as the global benchmark for taxonomies worldwide, given the large number of investors in the EU as well as its leadership in sustainable finance. Its comprehensive and technically advanced screening criteria, despite being rooted in EU-specific regulations, are widely referenced by other jurisdictions including Singapore, South Africa, Russia, and Colombia. The EU Taxonomy also plays a central role in the International Platform on Sustainable Finance's (IPSF) efforts to develop a Common Ground Taxonomy.

2. China Taxonomy

In Asia, the Chinese Green Bond Endorsed Project Catalogue and the ASEAN Taxonomy are key regional frameworks guiding sustainable investment. China's green bond market, previously fragmented across multiple regulators, took a major step toward harmonization with the release of the unified Green Bond Endorsed Project Catalogue in May 2020—referred to here as the Chinese Taxonomy. Unlike the EU's threshold-based approach, the Chinese Taxonomy uses a whitelist model, broadly defining eligible green activities without strict

performance criteria. While its definitions are generally more flexible than those of the EU or Climate Bonds Taxonomy, alignment with the EU framework typically ensures compliance with the Chinese one. However, its reliance on domestic legal references limits its applicability outside China.

3. ASEAN Taxonomy

The ASEAN Taxonomy serves as a foundational reference for the development of the Thailand Taxonomy, offering both guiding principles and sectoral screening criteria to support decarbonisation and environmental objectives. Its two-tiered structure—comprising the Fundamental Framework Tier[16] and the Plus Standard Tier[17]—accommodates the diverse economic contexts of ASEAN member states, enabling differentiated pathways toward sustainability. A key feature is its "traffic light" classification system, which categorizes activities as green, amber (transitional), or red based on their climate mitigation potential. The ASEAN Taxonomy acknowledges the existence of unique differences among the member-states of the regional community and allows them to achieve their adopted environmental and climate goals at their own individual pace.

4. Climate Bonds Taxonomy

The Climate Bonds Taxonomy, first published in 2013, is widely integrated into global sustainable finance frameworks due to its science-based, politically neutral, and internationally applicable criteria. As the first international taxonomy, it offers a foundational structure for developing national taxonomies. Key strengths include its focus on transitional activities, regular updates aligned with the latest climate science from bodies like the Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA), and its independence from national legislation, making it suitable for global adoption.

Therefore, the current taxonomy is broadly compatible with all above-mentioned taxonomies although there are some differences as the granular level.

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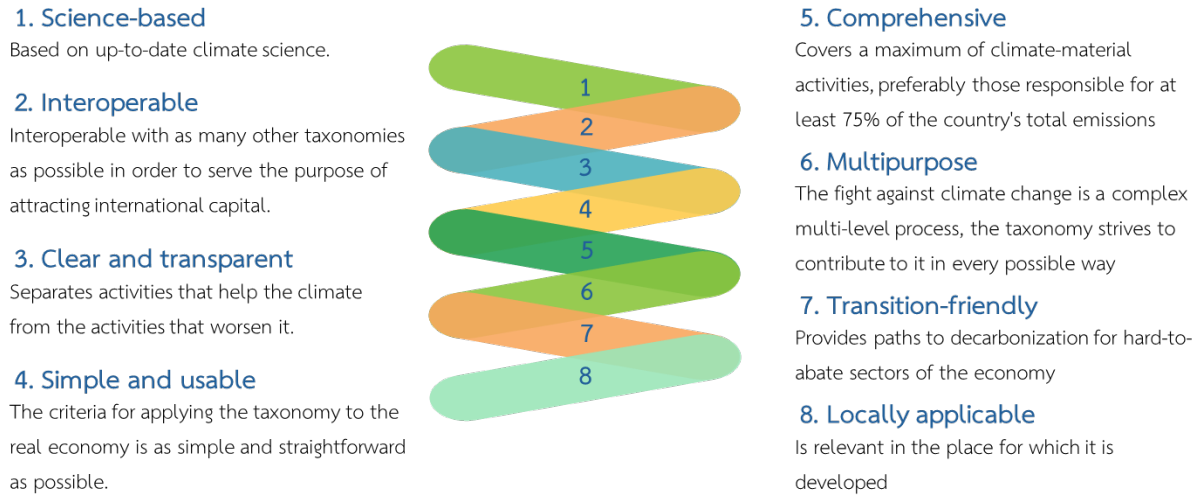
[16] The Foundation Framework tier of the ASEAN Taxonomy is a single sector-agnostic decision tree to classify activities into three categories: green, amber (transitional), or red. It is intended to be a simple one-dimensional tool for countries that consider it sufficient to only have an overarching guiding framework from the point of view of their capabilities and level of economic development.

[17] The Plus Standard tier enables users to evaluate economic activities against specific threshold criteria, aligning more closely with international best practices.

3.4 Thailand Taxonomy development principles

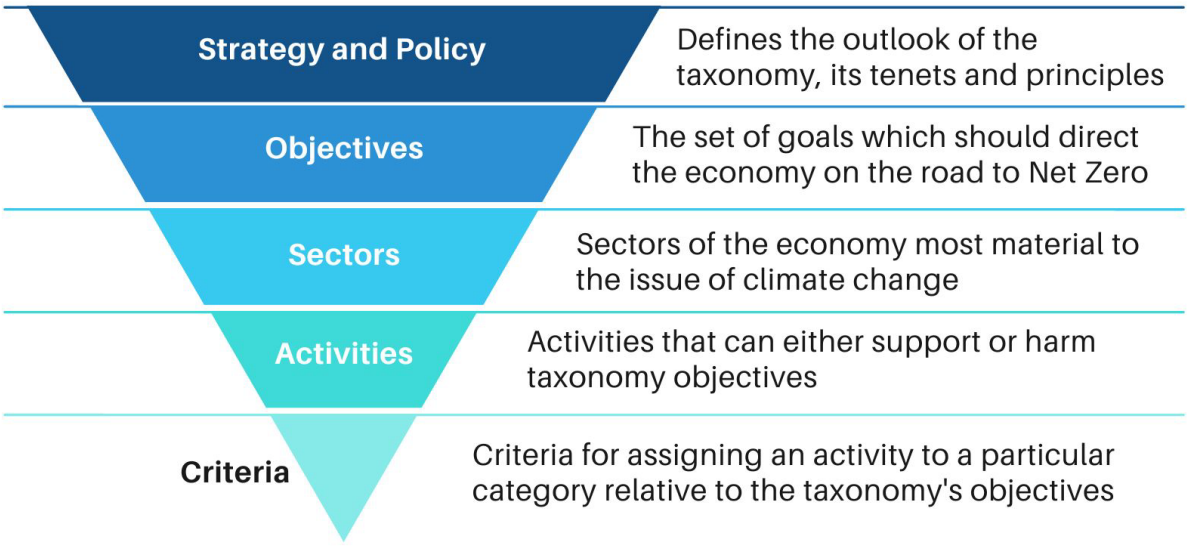
Based on G20 principles and in order to be credible, interoperable and usable. Therefore, Thailand taxonomy should be built up on the following premises:

Figure 3 Thailand Taxonomy development principles



Source: Climate Bonds Initiative

Figure 4 Thailand Taxonomy development pyramid



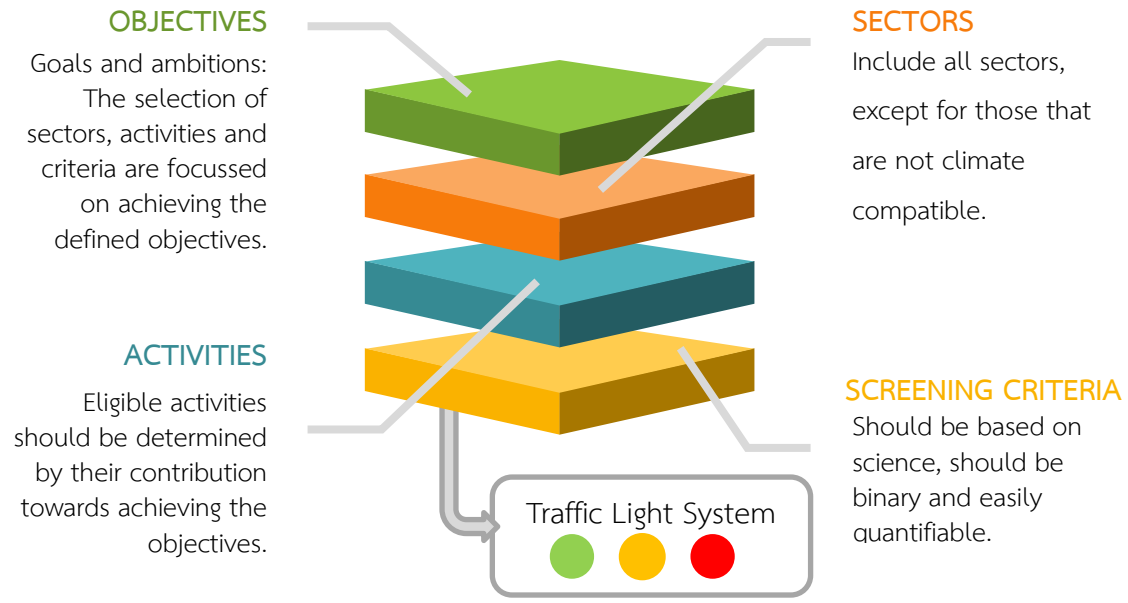
Source: Climate Bonds Initiative, 2023

4. Thailand Taxonomy structure

4.1 Taxonomy structure overview

The structure of most taxonomies follows a pattern similar to a tapering funnel: objectives, sectors, activities, screening criteria. This pattern is not universal (the Chinese Green Bond Endorsed Projects Catalogue and Malaysia Principles-based taxonomy are structured differently) but it is the most common and usable one for financial markets. It also provides a necessary degree of compatibility with other taxonomies and makes it easier for the taxonomy development committee to update it.

Figure 5 Key elements involved in taxonomy development



Source: Climate Bonds Initiative, 2022

The following sections discuss the processes and analyses that have informed the definition of the Thailand Taxonomy objectives, the section of key economic sectors and activities, and the design of screening criteria and thresholds for the sectors and activities.

4.2 Defining the objectives of the Thailand Taxonomy

Objectives of the Thailand Taxonomy are the top-level criteria with which all green activities need to be aligned. The principles of the Paris Agreement and SDGs lie at the core of any set of objectives. In the case of national taxonomies like the Thailand Taxonomy, they are defined by a country's policy, priorities, and environmental situation. The objectives one chooses may

affect the sectoral composition of the taxonomy as every single activity must lead to accomplishing at least one objective.

The following are the fundamental guiding principles for defining the objectives of the Thailand Taxonomy:

- **Science-based**. The taxonomy is based on scientific findings and recommendations.
- **Aimed at achieving Paris Agreement targets**. The goal of the Paris Agreement, to which Thailand is a signatory, is to limit global warming by 2°C and ideally by 1.5°C compared to pre-industrial levels.
- **Technologically neutral**. The taxonomy does not rule out the use of any kind of technology as long as it brings the country/activity closer to its mitigation target and meets established green or amber criteria.
- **Regularly revised**. The Thailand Taxonomy is considered a living document, meaning it must be regularly updated to remain current and relevant. This ensures alignment with the evolving landscape of climate science and climate-related technologies.

In addition, two significant aspects must be considered when outlining the Thailand Taxonomy objectives. **First, these objectives must reflect international obligations and national strategic documents. Second, they must be compatible with existing taxonomies to avoid market fragmentation**.

4.2.1 National Climate Strategies and Action Plans

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

Nationally Determined Contributions (NDCs): Thailand communicates its climate efforts through its NDCs under the Paris Agreement as following 1) 2030 Greenhouse Gas (GHG) Emissions Reduction Goals, 2) 2035 GHG Emission Reduction Goals, 3) Long-Term GHG Emissions Reduction Goals, and 4) Climate Adaptation[18]. As of March 2025, Thailand is in the

[18] The country's Second Updated NDC (2022) also states that "*in addition to its **mitigation** efforts, Thailand has treated **adaptation** as equally important*".

process of developing the next NDC, NDC 3.0, which will have more ambitious targets and a target year of 2035, with the base year adjusted to 2019.

- **Thailand's NDC Action Plan on Mitigation 2021–2030**[19] outlines the country's strategy to achieve its climate goals under the Paris Agreement, focusing on reducing GHG emissions while balancing economic growth. It aims to operationalize the targets set in the NDC, covering the economy-wide sectors excluding Land Use, Land-Use Change, and Forestry (LULUCF) at 30 - 40% GHG emissions reduction from the BAU in 2030.The action plan prioritizes five key sectors: Energy, Transportation, Agriculture, Industrial Processes and Product Use (IPPU), and Waste Management and Industrial Wastewater.
- In the **Long-Term Low Greenhouse Gas Emission Development Strategy (LT-LEDS)**[20], **mitigation** is a key priority. It is noted, however, that "*Thailand places high priority on addressing impacts and vulnerabilities of the sector* such as the agricultural sector, *through **adaptation** measures, as climate impacts, including shifting temperatures, more unpredictable rainfalls and extreme floods and drought have been widely experienced in the country, affecting the yields of major crops, such as rice, maize and sugarcane*".

In its **Climate Change Master Plan (2015-2050) (CCMP)**, Thailand indicates three key strategies that translate into climate objectives:

- **Climate Change Adaptation**, which aims to build climate resilience by integrating adaptation and resilience objectives into policies and measures in all sectors
- **Mitigation and Low Carbon Development**, which facilitates the development of mechanisms for GHG emissions reduction and leads to sustainable low carbon growth
- **Enabling Environment for Climate Change Management,** which seeks to build capacity around climate change by raising the awareness of relevant stakeholders as well as developing information-based tools and technologies to support climate change adaptation and mitigation

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

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

In addition, **Thailand's National Strategy (2018-2037)**[21] is a foundational policy framework that integrates climate change management into the country's long-term development vision. It puts forward the 33 environment-related goals (see *Thailand Background*). If these goals are grouped according to the general categories that are used in the international practice of taxonomy development, the following six main taxonomy objectives can be identified for Thailand.

Table 1 Thailand decarbonisation objectives grouping

Point number	Potential taxonomy objective
12, 27	Climate change mitigation
13, 15,	Climate change adaptation
3, 6, 7, 8, 9, 10, 24, 25	Sustainable use and protection of marine and water resources
5, 26	Resource resilience and transition to a circular economy
19	Pollution prevention and control
2, 4, 20	Protection and restoration of biodiversity and ecosystems
1, 11, 14, 16, 17, 18, 21, 22, 23, 28, 29, 30, 31, 32, 33	Not targeting environmental objectives (out of scope)

This categorization enables the mapping of all important priorities reflected in the Thai strategic documents as per Table 2 below.

Table 2 Environmental objectives in Thailand's strategic plans

National Strategy (thematical grouping)	CCMP	LT-LEDS	NDC
Climate change mitigation	Mitigation and low carbon development	Mitigation	Mitigation
Climate change adaptation	Climate change adaptation	Adaptation and resilience	Adaptation
Sustainable use and protection of marine and water resources	Enabling environment for climate change management		
Resource resilience and transition to a circular economy			

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

National Strategy (thematical grouping)	CCMP	LT-LEDS	NDC
Pollution prevention and control			
Protection and restoration of biodiversity and ecosystems			

Another consideration when developing the objectives for the Thailand Taxonomy would be to consider the objectives of EU Taxonomy and key ASEAN strategic documents apart from the ASEAN Taxonomy. According to the ASEAN Socio-Cultural Community Blueprint 2025[22], ASEAN member states need to identify individual as well as common climate and environment goals[23]. However, it must be recognised that the ASEAN Taxonomy does not have any specific objectives for pollution prevention and water/marine resources management. As a result, those can be partially aligned with the existing objectives of resource resilience and the protection of ecosystems.

In conclusion, as per Table 3 below, the identified six objectives of the Thailand Taxonomy give us 100% alignment with the EU taxonomy and 90-95% (depending on the final list of activities) alignment with the ASEAN Taxonomy on a broad level.

[22] ASEAN. (2016). ASEAN Socio-cultural Community Blueprint 2025

[23] Overall regional priorities include: (1) A resilient community with enhanced capacity and capability to adapt and respond to social and economic vulnerabilities, disasters, climate change as well as emerging threats and challenges, (2) To protect, restore, promote sustainable use of terrestrial ecosystem sources, halt biodiversity loss and reserve land degradation, (3) Sustainable forest management in the context of forest fire prevention and control, (4) Protection, restoration and sustainable use of the coastal and marine environment, respond and deal with the risk of pollution and threats to marine ecosystems and coastal environment, and (5) To conserve, develop and sustainably manage marine wetlands, peatlands, biodiversity and land, and water resources

Table 3 Thailand Taxonomy objectives alignment

Documents: / Objectives:	Thailand's National Priorities	EU Taxonomy	ASEAN Taxonomy
Climate change mitigation	+	+	+
Climate change adaptation	+	+	+
Sustainable use and protection of marine and water resources	+	+	+\-[24]
Resource resilience and transition to a circular economy	+	+	+
Pollution prevention and control	+	+	+\-
Protection and restoration of biodiversity and ecosystems	+	+	+

4.2.2 International Taxonomies comparison

Thailand Taxonomy is structured to support the nation's decarbonization agenda while aligning with the overarching objectives of established international and regional taxonomies. Table 4 presents a comparative analysis of the environmental objectives outlined in various taxonomy frameworks.

Table 4 The objectives from international and national taxonomies

EU Taxonomy	China Taxonomy	ASEAN Taxonomy	Singapore Taxonomy	Climate Bonds Taxonomy
Climate change mitigation	Addressing climate change	Climate change mitigation	Climate change mitigation (current version)	Climate change mitigation
Climate change adaptation		Climate change adaptation	Climate change adaptation*	Climate change adaptation

[24] Means the objective is partially aligned

EU Taxonomy	China Taxonomy	ASEAN Taxonomy	Singapore Taxonomy	Climate Bonds Taxonomy
Sustainable use and protection of water resources				
Transition to a circular economy	More efficient resource utilisation	Promote resource resilience & transition to a circular economy	Promote resource resilience and circular economy*	
Pollution prevention and control			Pollution prevention and control*	
Protection and restoration of biodiversity and ecosystems	Environmental improvement	Preservation of healthy ecosystem & biodiversity	Protect healthy ecosystems and biodiversity*	

*Note: not covered in the current version

4.2.3 The list of the objectives for Thailand Taxonomy

Based on the analysis in the previous section, the Thailand Taxonomy is designed to cover the following six environmental objectives:

1. **Climate change mitigation**

This objective demands the reduction of GHGs emitted as the result of human activity in the country, which is necessary to avoid catastrophic consequences of climate change.

An activity can be considered to have met this objective if it makes a substantial contribution to:

- **Avoidance of GHG emissions**. These are 'green activities' already having very low or near-zero emissions. More capital is required to increase their development and broader deployment
- **Reduction of GHG emissions**. Some activities (the production of steel, cement, aluminium, etc.) are critical to the functioning of the modern economy but are carbon intensive. These activities are called transitional. The current level of technological development is insufficient to decarbonise them entirely in short term, but they must significantly improve their performance over time

- **Enabling GHG-reducing activities**. These activities do not reduce GHG emissions but facilitate other mitigation activities. Examples are renewable power transmission, carbon capture, utilisation and storage, data-driven solutions etc.

2. **Climate change adaptation**

This objective demands Thailand to substantially reduce the adverse impact of climate change on its people, nature, and assets as well as on economic activity itself. Climate change adaptation may also increase country's resilience to the adverse physical impacts of current and future climate changes and/or capture new economic opportunities from climate change.

3. **Sustainable use and protection of marine and water resources**

This objective deals with a broad range of issues important to Thailand, from sustainable development of coastal areas to retrofitting of water treatment facilities.

4. **Promote resource resilience and transition to a circular economy**

This objective stems from the necessity to maximise resource productivity. With the growth of the Earth's population and aggravating climate change effects, Thailand (as well as all other countries) will have to deal with the ever-increasing scarcity of natural resources (primarily food and water) and rising prices. The introduction of lean manufacturing and circular economy practices will benefit Thailand from environmental and economic perspectives.

5. **Pollution prevention and control**

This objective leads to implementing activities that help the country to prevent and control pollution on all levels, including industrial, agricultural, and household pollution. It helps to improve the quality of air, soil, and water, as well as decrease the waste of valuable resources.

6. **Protection and restoration of biodiversity and ecosystems**

This objective implies preventing the loss of plants and living species whilst also sustainably managing, conserving, and restoring their habitats. This is important not only for protecting Thailand's unique landscapes and ecosystems but also for climate change mitigation because healthy habitats remove a substantial portion of carbon from the atmosphere.

4.3 Sectoral assessment

A matrix of all country-level economic activities in the country is built with respect to their GHG emission profile and economic parameters. The International Standard Industrial Classification (ISIC) of economic activities was selected as a general framework for classifying all sector-specific activities. The ISIC framework was established by the United Nations and is largely compatible with other international frameworks, while providing a sufficient degree of granularity. There is currently no ASEAN-specific industrial standard that is commonly adopted, so the ISIC codes can provide a common reference framework across ASEAN countries.

Using ISIC-based sector and activity classification, the Thailand Taxonomy should sufficiently include all economic sectors and activities in the economy that could be considered green and transitional, as well as providing the basis for the exclusion of red activities. Sectors and activities covered by the taxonomy must be prioritised based on:

- **The substantial contribution** to the key objectives of the taxonomy, which comprises 6 environmental objectives.
- **The evaluation of multiple parameters** such as (among others) their GHG emission profile, their contribution to the country's Gross Domestic Product (GDP), the share of Foreign Direct Investment (FDI), and the technical viability for decarbonisation.

The first parameter that must be assessed is the share of GHG emissions produced by each different sector of the economy as demonstrated in Table 5. It is important to note that emissions in the LULUCF sector, which serves both as a carbon emitter and as a carbon sink, are excluded if the amount of the carbon absorbed by the sink exceeds the carbon emitted by the sector, thus resulting in net removals.

Table 5 Thailand's GHG emissions (exclude sinks) by category in 2022

Economic Sector	Sector (IPCC 2006 classification)	GHG Emission, total in ktCO2eq, 2022	% of Total GHG Emission
	1 Energy	**254,307.21**	**65.9%**
	1A Fuel combustion activities	**245,812.43**	**63.7%**
Energy	**1A1 Energy industries**	**92,222.65**	**23.9%**
	1A1a Electricity and Heat Production	82,615.97	21.4%
	1A1b Petroluem Refining	9,606.68	2.5%
Manufacturing and Construction	**1A2 Manufacturing industries and construction**	**62,578.28**	**16.2%**
Transport	**1A3 Transport**	**77,021.31**	**20.0%**
	1A3a civil aviation	1,738.51	0.5%
	1A3b Road transportation	74,435.79	19.3%
	1A3c Railways	228.24	0.1%
	1A3d Water-borne navigation	618.76	0.2%
All sectors	**1A4 Other sectors**	**13,990.18**	**3.6%**
	1A5 Non-specified	NO	NO
Mining	**1B Fugitive emissions from fuels**	**8,494.78**	**2.2%**
	1B1 Solid fuels	563.00	0.1%
	1B2 Oil and natural gas	7,931.78	2.1%
	1B3 Other emissions from energy production	NO	NO
Manufacturing	**1C Carbon dioxide transport and storage**		**0.0%**
	1C1 Transport of CO2	NO	NO
	1C2 Injection and storage	NO	NO
	1C3 Other	NO	NO
Manufacturing	**2. Industrial Process and Product Use**	**40,527.22**	**10.5%**
	2A Mineral Industry	**17,001.61**	**4.4%**
	2A1 Cement Production	15,803.16	4.1%
	2A2 Lime Production	124.67	0.0%
	2A3 Glass Production	334.12	0.1%
	2A4b Other Uses of Soda Ash	298.86	0.1%

Economic Sector	Sector (IPCC 2006 classification)	GHG Emission, total in ktCO2eq, 2022	% of Total GHG Emission
	2A4d Other	440.80	0.1%
	2B Chemical Industry	**11,668.31**	**3.0%**
	2B2 Nitric Acid Production	177.16	0.0%
	2B4 Caprolactam, Glyoxal	246.05	0.1%
	2B8b Ethylene	10,582.08	2.7%
	2B8c Ethylene Dichloride and Vinyl	528.38	0.1%
	2B8e Acrylonitrile	141.96	0.0%
	2B8f Carbon Black	7.87	0.0%
	2C Metal Production	**425.32**	**0.1%**
	2C1 Iron and Steel Production	425.32	0.1%
	2D Non-Energy Products from Fuels and Solvent Use	**292.74**	**0.1%**
	2D1 Lubricant Use	292.74	0.1%
	2F Product Uses as Substitutes for Ozone Depleting Substances	**10,383.15**	**2.7%**
	2F1 Refrigeration and Air Conditioning	10,383.15	2.7%
	2G Other Product Manufacture and Use-Industrial Processes	**756.09**	**0.2%**
	2G1 Electrical Equipment	756.09	0.2%
Agriculture	**3. Agriculture**	**68,933.74**	**17.9%**
	3A Enteric Fermentation	18,347.24	4.8%
	3B Manure Management	3,730.02	1.0%
	3C Field Burning of Agricultural Residues	1,688.75	0.4%
	3D Liming	16.02	0.0%
	3E Urea Fertilization	1,110.89	0.3%
	3F Direct N2O Emission from Managed Soils	7,349.27	1.9%
	3G Indirect N2O Emission from Managed Soils	2,711.33	0.7%
	3H Indirect N2O Emission from Manure Management	667.90	0.2%
	3I Rice Cultivation	33,886.79	8.8%

Economic Sector	Sector (IPCC 2006 classification)	GHG Emission, total in ktCO2eq, 2022	% of Total GHG Emission
Waste	**5. Waste**	**22,172.97**	**5.7%**
	5A Solid Waste Disposal	**9,988.82**	**2.6%**
	5A1 Managed Waste Disposal Sites	6,386.24	1.7%
	5A2 Unmanaged Waste Disposal Sites	3,602.58	0.9%
	5B Biological Treatment of Solid Waste	**202.29**	**0.1%**
	5C Incineration and Open Burning of Waste	**179.69**	**0.0%**
	5D Wastewater Treatment and Discharge	**11,802.17**	**3.1%**
	5D1 Domestic Wastewater Treatment and Discharge	2,707.83	0.7%
	5D2 Industrial Wastewater Treatment and Discharge	9,094.34	2.4%
Total in GHG Inventory of Thailand		**385,941.14**	**100%**
Total in GHG emissions covered in Thailand Taxonomy (approximation)		**363,456.17**	**94.2%**

Source: Thailand Biennial Transparency Report (DCCE, 2024)[25]

In terms of contribution to the Thai GDP, the service sector makes the biggest contribution with more than 58% of GDP in 2021 followed by manufacturing (27.1%), which contains carbon-intensive industries representing between a quarter and a third of the country‘s economic activities. The Thailand Taxonomy should therefore be developed to cover these economically important sectors to facilitate their green transition. At the same time, the Thailand Taxonomy should also be developed to cover economic sectors where FDI plays an important role, or where there is potential to attract more FDI, particularly for sectors that are essential to accelerate the country’s decarbonization pathway.

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

Table 6 Major economic indicators and trends in carbon-intensive industries, USD billion

Year	Agriculture, forestry and fishing	Manufacture of chemicals and chemical products	Manufacture of electronics	Manufacture of automotives and parts	Transportation and storage	Construction	Electricity, gas, steam and air conditioning supply
Volume and share of FDIs for Taxonomy-relevant sectors, million USD (% of total FDI for a given year)							
2020	16.71 (0.03%)	927.25 (1.87%)	-266.75 (-0.54%)	-565.02 (-1.14%)	64.03 (0.13%)	196.83 (0.40%)	74.78 (0.15%)
2024	-26.27 (-0.036%)	559.25 (0.76%)	1,665.18 (2.27%)	1,326.59 (1.81%)	225.78 (0.31%)	179.27 (0.24%)	155.38 (0.21%)
Volume and share of GDP for Taxonomy-relevant sectors, trillion baht (% of total GDP for a given year)							
2020	1.32 (8.41%)	0.63 (4.01%)	4.40 (28.03%)		1.26 (8.03%)	0.68 (4.33%)	0.39 (2.48%)
2024	1.57 (8.49%)	0.74 (4.00%)	5.37 (29.03%)		1.57 (8.49%)	0.80 (4.32%)	0.54 (2.92%)

Source: Bank of Thailand data[26]; The Office of the National Economic and Social Development Council data[27]

Based on the data and information provided above, it is therefore possible to derive a long list of sectors to be initially covered by the Thailand Taxonomy: energy, water supply (sewerage, waste & remediation), transportation, agriculture, and industrial production. As shown in Table 5-6, these sectors combined encompass the majority of the country's GHG emissions around 95% of GHG emissions and more than 40% of its economic activities. In addition, these sectors consist of both sectors considered green as well as sectors that are in the process of transitioning towards low carbon. The ratio of emissions share to GDP reflects that the hard-to-abate industries should be decarbonized first to achieve maximum results in terms of climate change mitigation.

It should be noted that the sectors that are in the list above appear differently in the sector list of individual official documents because they use different sector classification systems. More specifically, Thailand's Second Updated NDC document reports sector-based emissions by using the IPCC's 2006 code for sector classification, while the Bank of Thailand and other Thai government agencies use the ISIC. To illustrate the comparability and discrepancy between the IPCC's 2006 code and the ISIC code, the following matrix shows how the IPCC's

[26] Bank of Thailand, Foreign Direct Investments Inflows

[27] The Office of the National Economic and Social Development Council, National Accounts

2006 sectors can be mapped against the ISIC sectors, thus allowing users of the Thailand Taxonomy to relate the ISIC-based sectors in the Thailand Taxonomy and to those in the NDC. The matrix is indicative in nature and is intended to provide guidance for further actions rather than precisely equate one group with the others.

It is important to note that this prioritization exercise is based on both an expert assessment and quantitative measures, while taking into account technological viability of decarbonisation. Accordingly, the Thailand Taxonomy develops sectoral prioritization as outlined below:

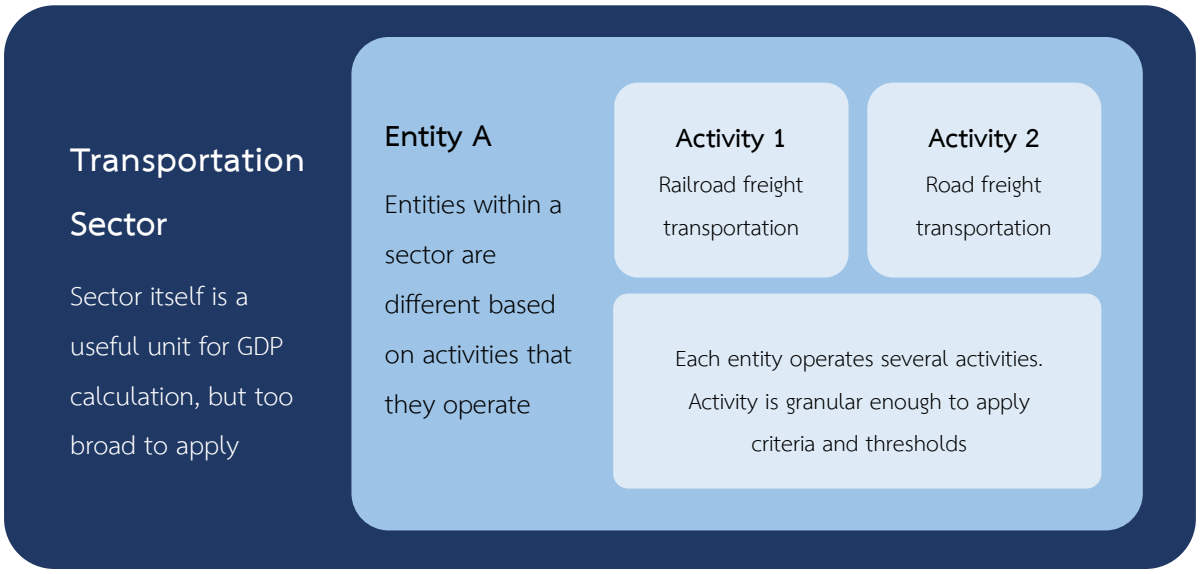
Table 7 Sector prioritisation rationale

Sector	Rationale
Energy	The energy sector is a major contributor to greenhouse gas emissions in almost every country in the world. Existing technologies have reached a level at which replacing high-emission fuels with renewable energy sources is justified not only climatically, but also economically. Including this sector in the taxonomy would help direct capital flow in the right direction.
Transportation	The sector is the second biggest in terms of emissions and prioritized by the Government of Thailand decarbonisation policies, but it is underinvested, both generally and from the point of view of green transition. The sector is well-researched and provides numerous technological opportunities for GHG emissions abatement, from electric cars to sustainable fuels
Agriculture	Agriculture is one of the hardest sectors to decarbonize because of its diversity and complexity. In particular, the units where activities are carried out are generally small and are not always able to get access to the latest innovations. Nevertheless, thanks to low-carbon farming technologies, the science-based approach to decarbonizing the sector can help to strengthen its component as a carbon sink.
Construction and Real Estate	Although direct information about sector-related GHG data is not available, its proportion of GDP and importance for the Thai economy makes it a natural target for decarbonization through the construction of green buildings and incremental introduction of new materials that can reduce long-term carbon footprint.
Manufacturing	The sector attracts the bulk of all investments in the country but also concentrates “red” and hard-to abate activities such as fossil fuels, production of steel and cement. Technologies are lacking in many cases, but the application of carbon capture and new energy sources such as hydrogen may lead to positive mitigation outcomes
Water and Wastewater Supply, Processing and Remediation	Although small on a scale, this sector is very important for human well-being and quality of life. Its huge emissions-to-GDP share ratio makes it an important decarbonisation target, and in many cases the technologies applied for this decarbonisation have numerous positive side-effects on economy, ecology, and health

4.4 Methodology for Activities Selection

Activities are the processes to which specific criteria and screening thresholds are applied within this taxonomy. All major international taxonomies work with activities as operational taxonomical units and not, for example, sectors or entities. This is convenient because an activity is, on the one hand, large enough to be the object of a bond or loan issuance and, on the other hand, granular enough to be separated from similar activities. An entity comprises several activities, some of which can be decarbonised with significant emission reduction benefits (e.g., steelmaking, battery production, power generation etc.), while the effect of others on climate is negligible (e.g., management, accounting etc.).

Figure 6 Example of the relationship between sectors, entities and activities



Source: Climate Bonds Initiative

The proposed methodology for the inclusion of activities in the Taxonomy involves an assessment of activities against the following eligibility criteria:

- **Substantial contribution** to the environmental objectives of the Taxonomy specified for each sector. This criterion addressed the issue of the climate materiality of the activity. In the case of climate change mitigation, criteria are typically defined as the potential to emit or absorb large amounts of GHGs that can, in turn, affect the climate. Some of the activities, however, concurrently contribute to other objectives of the Taxonomy, such as climate change adaptation, sustainable use and protection of marine and water resources, resource resilience and promotion of circular economy,

pollution prevention and control, and protection and restoration of biodiversity and ecosystems.

- **Availability of verified decarbonisation techniques and methodology**. To date, decarbonisation pathways have been developed for a significant number of climate-material activities, but for some hard-to-abate activities, such as the manufacture of cement or aviation, it is not possible to wholly decarbonize using existing technologies. Therefore, for those sectors where decarbonisation is not entirely possible, the Taxonomy will incorporate a methodological approach based on transition and measures that allow significant decarbonisation efforts.
- **Existence in other taxonomies (especially reference taxonomies)**. Matching the list of activities with similar lists in other taxonomies is important in terms of interoperability, facilitating international trade and financial transactions and preventing fragmentation of global trade flows. Compatibility is usually provided through the matching codes in the International Standard Industrial Classification (ISIC) of economic activities, which was selected as a general framework for classifying all sector-specific activities.

4.4.1 Environmental materiality assessment

The first and most important parameter that must be considered is the climate materiality of the proposed activities. As shown in Table 5: GHG emissions and sinks by category in 2022, both in terms of emissions or in terms of their ability to act as carbon sinks[28], energy, transportation, agriculture, buildings-related and manufacturing-related activities occupy the top positions by volume in Thailand's GHG emission inventory ranking. Regarding to Table 5: GHG emissions and sinks by category in 2022, the majority of climate-material activities in Thailand will be covered by the Taxonomy.

In addition to Climate Change Mitigation, it is crucial to underline that other environmental objectives can also be material in certain sectors, particularly in waste management and agriculture. In the context of waste management, while some activities can contribute to

[28] Carbon sink is any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere (IPCC Glossary definition). Economic activities work as carbon sinks when they remove more GHGs from the atmosphere that they produce. They are marked in the table as negative values.

Climate Change Mitigation by mainly enabling other sectors of the economy to reduce GHG emissions through waste prevention, waste separation, reuse and recycling, the majority of waste management activities can also contribute significantly to other environmental objectives, especially Resource Resilience and transition to Circular Economy and Pollution Prevention and Control.

Similarly, in agricultural and forestry sectors, it is equally important to consider other environmental objectives such as climate adaptation and protection and restoration of biodiversity and ecosystems, aspect. Given the sector's inherent vulnerability to the physical risks posed by climate change, addressing adaptation is crucial for ensuring the resilience of agricultural practices.

4.4.2 Technological feasibility [29] assessment and comparison with other taxonomies

International climate science has come quite far in finding technical options for decarbonisation. Decarbonisation trajectories and technical solution guides have been developed for most high-emitting sectors, such as energy, industry, and transportation. Organisations such as the Climate Bonds Initiative, Science-Based Targets Initiative, International Energy Agency, and many others are developing technical solutions in this area. The results of the work of these organisations have been transformed into criteria that are either already used in other taxonomies or described and operationalized in the sectoral studies of the Climate Bonds Initiative. This section compiles references to credible and scholarly sources of technical criteria and other taxonomies that are used in the development of Thailand Taxonomy.

This approach, which builds on the best practices of other taxonomies, also provides Thailand Taxonomy with the necessary level of credibility and interoperability with other national and international taxonomies. Ensuring the interoperability of Thailand Taxonomy with benchmark taxonomies is one of the critical design features to establish Thailand as a major destination of international green capital. Interoperability will facilitate the flow of cross-border capital by

[29] In the context of taxonomies, technological feasibility assessment means analyzing the technical feasibility of decarbonizing selected sectors and activities

reducing the costs of climate due diligence and reporting for investors (see Annex: Thailand Taxonomy and other taxonomies mapping)

4.4.3 Economic relevance of the proposed activities

Climate-material activities are among the most important to Thailand's economy. Many activities important to the Thai economy may not have any climate materiality and cannot, therefore, be included in the taxonomy. The table below is intended to give an indication of what proportion of each sector's output is accounted for by the activities covered by the taxonomy.

Several important factors should be considered when examining the table:

- The economic categories that a government tracks in such statistics are often broader in scope than the activities included in the taxonomy. For example, the economic category "Manufacture of basic precious and other non-ferrous metals" is included in this table, but only aluminum production is actually included in the Taxonomy. Therefore, the table should be considered as an indicative reference tool rather than a precise description of the correspondence of the Taxonomy's activities to their share in the country's GDP.
- Many of the activities included in the Taxonomy (Manufacture of renewable energy technologies and products; Manufacture of energy efficiency equipment for buildings; Manufacture of other low-carbon technologies) essentially include production activities belonging to different economic codes. For this reason, the overlap between economic and taxonomic activities cannot be full and complete, but the main economic categories important to the taxonomy have been taken into account.

Table 8 Economic materiality of selected activities

Economic activity title	Volume in current market price, 2022, % from total relative to sectoral GDP	Economic activity title	Volume in current market price, 2022, % from total relative to sectoral GDP
Agricultural sector			
Growing cereals (except rice), leguminous crops and oil seeds	0.31	Growing spices, aromatic, drug, and pharmaceutical crops	0.68
Growing of rice	18.78	Growing other perennial crops	11.9
Growing vegetables and melons, roots, and tubers	17.65	Raising of cattle and buffaloes	4.42
Growing sugar cane	2.35	Raising of sheep and goats	0.14
Growing of tobacco	0.07	Raising of swine/pigs	5.04
Growing fibre crops	0	Raising of poultry	3.83
Growing of other non-perennial crops	2.63	Raising of other animals	0.32
Growing of tropical and subtropical fruits	13.69	Support activities for crop production	1.73
Growing oleaginous fruits	6.28	Silviculture and other forestry activities	0.11
Growing beverage crops	0.03	Logging	0.71
Share of sectoral GDP covered by the taxonomy		**90.67%**	
Building and real estate sector			
Construction of buildings	38.5		
Share of sectoral GDP covered by the taxonomy		**38.5%**	
Manufacturing sector			
Manufacture of basic chemicals	1.9	Manufacture of motorcycles	1.01
Manufacture of plastics and synthetic rubber in primary forms	5.05	Manufacture of bicycles and invalid carriages	0.19
Manufacture of cement, lime, and plaster	0.95	Repair of transport equipment, except motor vehicles	0.04

Economic activity title	Volume in current market price, 2022, % from total relative to sectoral GDP	Economic activity title	Volume in current market price, 2022, % from total relative to sectoral GDP
Manufacture of basic iron and steel	0.91	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	0.24
Manufacture of basic precious and other non-ferrous metals	0.74	Manufacture of parts and accessories for motor vehicles	1.26
Manufacture of batteries and accumulators	0.28	Building of ships and floating structures	0.98
Manufacture of domestic appliances	2.53	Manufacture of railway locomotives and rolling stock	0.01
Manufacture of motor vehicles	6.12	Manufacture of electric lighting equipment	0.13
Manufacture of measuring, testing, navigating and control equipment	0.71		
Share of sectoral GDP covered by the taxonomy		**23.05%**	
Waste management sector			
Water supply, sewerage, waste management and remediation activities	0.4		
Share of sectoral GDP covered by the taxonomy		**0.4%**	

Source: National Economic and Social Development Council (NESDC)

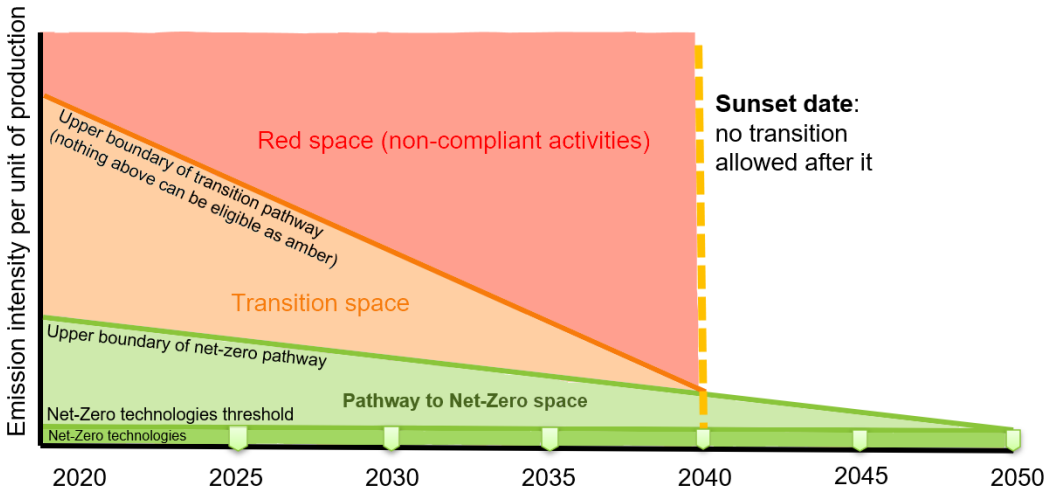
4.4.4 Out of scope

If the activity is not present in the taxonomy, it does not mean that this activity is harmful to its objectives. It is simply considered “out of the scope” due to its low climate materiality or lack of science-based criteria. The taxonomy does not make any decision about it, and it should be reported in disclosure documents as “out of scope”.

4.5 Model for criteria and thresholds assessment

Modelling allows the creation of thresholds for activities that must transition to a pathway to net-zero by 2050. In most cases, these are transitional (amber) activities that need to follow an ambitious pathway to decarbonize in a journey towards green, as green activities are the category used for those that are already near-zero or have a clear pathway alongside trajectory. Some activities will have two thresholds: a **green one**, representing the Paris-aligned activities, and the **amber one**, representing activities, that are in transition towards a green/Paris-aligned pathway. Below is the general idea behind establishing pathways and thresholds that will be repeated for each single sector.

Figure 7 A practical meaning and graphic representation of green, transition and red spaces



Source: Climate Bonds Initiative

For modelling credible transition pathways for the activities of this taxonomy, the Sectoral Decarbonization Approach (SDA) is applied, which is a widely adopted methodology used by the Transition Pathway Initiative (TPI) and the Science Based Targets Initiative (SBTi)[30]. The SDA utilises data and scenarios developed by international organizations, such as IEA, IPCC, and International Institute for Applied System Analysis (IIASA). The present model includes the following scenarios:

- Nationally Determined Contribution scenario (based on the Thailand's latest NDC and other national documents)

[30] Transition Pathway Initiative. (2021). Carbon Performance Assessment of Electricity Utilities: Note on Methodology

- Below 2 Degrees Scenario (based on SDA calculations and consistent with Paris Agreement targets)
- 1.5 Degree Scenario (based on SDA calculations and fully consistent with Paris Agreement targets)
- International Organisations Scenario, calculated by respected international organisations based on data by national participants. Pathways created this way often represent internationally agreed scenarios rather than the most ambitious.

The Taxonomy's activity thresholds are calculated based on the 1.5-degree scenario, meaning that all sectors must move to net-zero by 2050. This is in line with the latest climate science. There are several objective reasons for utilizing 1.5-degree for this taxonomy:

- **Alignment**. International taxonomies (EU, Climate Bonds, ASEAN) either directly postulate the need to pursue 1.5-degree pathway or consider it strongly preferable[31].
- **Attractiveness**. International climate-aware investors want to see 1.5-degree compliant projects and this fact needs to be considered if an access to international financial market is a prerogative.
- **Closing the gap**. To stay within 1.5-degrees requires a 45 - 50% cut in global emissions by 2030. Right now, the world is on track to achieve 9% emission cut by 2030 – way off that requirement for even a 2-degree warming scenario. Setting the ambition of 1.5 degrees keeps that sense of urgency at the forefront of policy and decision making.
- **Cost effectiveness**. The cost of aligning with 1.5 degrees is much lower than the cost of exceeding it.

4.5.1 Scope of emissions

For all activities, emissions include only scope 1 and 2 emissions unless stated otherwise. For instance, activities such as bioenergy production and hydrogen manufacturing are recommended for Life Cycle Assessment (LCA), particularly where emissions are most concentrated along the value chain.

[31] ASEAN Taxonomy says that the goal is to "limit the global average temperature increase to well below 2°C, preferably 1.5°C, above preindustrial levels".

4.5.2 Relevant decarbonisation measures

The taxonomy aims to reduce greenhouse gas emissions by various economic agents in Thailand as well as the Thai economy as a whole. It is technology-neutral, i.e., it allows any means of achieving the mentioned thresholds for compliance with green and amber criteria. These techniques can include complete replacement of relevant units, devices and machines with less emitting application of energy efficiency measures, installation of additional carbon capture and sequestration units, etc.

4.5.3 NDC-based amber thresholds

Thailand's NDC-based pathways and thresholds are applied as amber criteria for certain activities in order to consider national conditions of Thailand. They are calculated based on the best available sectoral data, published in the Thailand's Long-Term Low Greenhouse Gas Emission Development Strategy (Revised Version November 2022), which are generally more precise than those calculated on "best-in-class" principle.

However, like most countries, the NDC is not aligned with a 1.5-degree trajectory. According to Climate Tracker, the current Thailand's conditional NDC target aligns with less than 3 degrees of warming and, global climate breakdown, which is challenging for Thailand and 195 other countries to align with the Paris Agreement.[32]

Although many activities have a starting point that is yet to align with the green transition pathway (Paris-aligned), the NDC is used as the upper boundary for an amber transition zone that can be seen as a grace period to allow users to attract finance to reach a green pathway.

4.5.4 Traffic light system for Thailand Taxonomy

1. Green activities are substantially contributing to the goal of climate change mitigation by operating at or close to the net-zero goal by 2050. In most cases, green thresholds are either EU Taxonomy or Climate Bonds Taxonomy-aligned because both taxonomies are based on extensive multiyear research by international technical expert groups and therefore serve as reference taxonomies for international taxonomies. Two types of activities are included into this category:

[32] Climate Action Tracker, 2022, Thailand, https://climateactiontracker.org/countries/thailand/

- **Near zero activities**: activities already at or near net-zero emissions that may require some further decarbonisation but not a significant transition (e.g., solar or wind power generation or operation of electric fleet-based transportation services).
- **Pathway to zero activities**: activities that are needed beyond 2050 and have a clear 1.5-degree decarbonisation pathway to 2050 (e.g., shipping).

2. Amber activities (transitional) are facilitating significant emissions reductions in the short term with reliable decarbonisation pathways and prescribed sunset dates. The activities have not yet reached net zero emissions but can still be improved with viable technologies. In most cases, the amber category is generally relevant only for the existing infrastructure and activities that can be retrofitted and cannot be applied to new ones (which should directly adopt green technologies) to avoid locking-in unsustainable technologies in new projects. In some cases, enabling activities (those that serve as enabling other green activities but not green themselves, e.g., grid infrastructure) are also included in this category. For Thailand Taxonomy, the pathways are taking the national context, e.g. NDC, into account.

An activity is be considered transitional if it meets the following criteria:

- Significantly improves its performance over time, demonstrated by tracking, monitoring, and disclosing CO_2 equivalent emissions. Alignment with a pathway to net-zero by 2050 must be the ending point of any transitional activity.
- Does not lock in carbon-intensive assets or processes for the future. If it is impossible to decarbonise, the activity must be phased out.
- Does not hamper the development and deployment of low-carbon alternatives.
- Demonstrates a pathway to approach the climate objectives

To create thresholds that meet these objectives, several measures can be utilised:

- **Sunset dates**. The taxonomy establishes a date after which transitional activities cease to be compliant. For example, new amendments to the EU Taxonomy deem low-emitting (270g CO_2e/kWh) gas power plants suitable if their construction permit is issued before 31 December 2030.[33]

[33] European Commission. (2022). European Commission Delegated Regulation (EU) 2022/1214 of 9 March 2022

- **Best in class**. The threshold for the activity may be established as representing the top 10-15% of best installations in the country, region, or globally. This method is widely used in sectors with no clear way to calculate a 1.5-degree aligned path such the manufacturing sector (Cement, Steel, Chemicals).
- **Percentage change**. If retrofitting or modernisation of the facility is discussed, a fixed percentage change may be an excellent way to establish a threshold. For example, in buildings renovation, the point is based on reducing Primary Energy Demand (PED) by at least 30%.

Transition as a concept

The concept of "transition" refers to **the time-bound shift toward a green economy, with the global goal of achieving net-zero emissions by 2050**, as recommended by the IPCC. While all sectors must contribute to this transition, **some sector face greater technological and economic challenges and are often referred to as "hard-to-abate" or "transitional" sectors**. These sectors are integral to modern economies like Thailand's and require tailored criteria within the Thailand Taxonomy. According to the white paper "Financing Credible Transitions" from CBI, transitional activities may include interim investments that significantly reduce emissions by 2030, even if they do not play a long-term role post-2050. As such, incorporating clear guidance for hard-to-abate sectors is essential for a credible and inclusive taxonomy framework.

Therefore, green activities are already aligned with the 1.5°C climate goal, though they may not yet achieve near-zero emissions. Amber activities, on the other hand, are on a defined trajectory toward alignment with this target. The amber category represents a transitional phase—an essential, time-bound pathway toward full decarbonisation. In addition, aligning with the Paris Agreement targets demands a fundamental shift in the global economy, requiring deep, and in some cases, transformative change across sectors and activities.

3. Red activities ("stranded") are the ones that are currently not compatible with net-zero trajectory and are not going to become compatible in the future. These activities are harmful for climate change mitigation. For the transition to net zero by 2050 to happen, they should be phased out completely (for example, electricity generation from coal). It is very important

to note that not all activities are assessed yet by international climate science, so the absence of activity in the green and amber categories does not mean that it is red.

This Taxonomy lists economic activities and the relevant criteria to classify them as green, excluded (red), or transitional (amber). It does not intend to single out “good” or “bad” actions and it does not serve as a tool for assessing the possible financial performance of companies.

For practical application of the Taxonomy, color codes in the activity cards mean the following:

- **Green activities:** compliance with the criteria means substantial contribution to one or more of primary taxonomy objectives. These activities can be financed through green financial instruments.
- **Amber activities**: compliance with the criteria means that the activity is in transition from the current state to the future sustainable state (green activity). Transition finance may be solicited for such activities or projects. If the section features N/A, it means that no amber category is available as the activity can be decarbonised quickly using the existing technological solutions.
- **Red activities**: compliance with the criteria mean that in activity in its stated form is exceptionally harmful to the objective of climate change mitigation. No sustainable financing (green, transition, sustainability-linked or any other type) can be solicited to implement it (it can still solicit traditional financing). If this section features N/A, it means that this activity does not have a mode of operation that makes it exceptionally harmful to climate change mitigation.

4.5.5 Practice-based approach

A practice-based framework is employed for the agricultural sector—specifically in crop cultivation, livestock, and aquaculture—where only taxonomy-aligned or "green" activities are identified, without explicitly designating non-aligned activities. This approach addresses the inherent challenges in accurately quantifying GHG emissions, which are highly variable depending on geographic conditions and the specific species of crops and livestock involved. Consequently, the taxonomy emphasizes internationally recognized best practices that are empirically associated with GHG emission reductions. These practices are categorized into

three tiers, reflecting varying levels of technological complexity and capital investment requirements. This tiered structure is designed to ensure that the taxonomy remains inclusive and does not impose additional adaptation burdens on smallholder farmers.

Annex 1: Thailand Taxonomy Activities, ISIC, ANDBI, and TSIC Mapping

It should be noted that the ASEAN Taxonomy (which is under development) uses the Activities Not Defined By ISIC (ANDBI) classification system, which is different from ISIC 4. ANDBI sectors are added to the table below to facilitate comparison between activities in the Section 4 of this Thailand Taxonomy with those in the ASEAN Taxonomy.

Table 9 List of Thailand Taxonomy activities and their corresponding ISIC, ANDBI, and TSIC

Thailand Taxonomy activities	ISIC Code	ANDBI	TSIC
Energy sector			
Solar energy generation	D351 - Electric power generation, transmission, and distribution	D35104 Solar power gen generation	D351 - Electric power generation, transmission, and distribution
Wind energy generation		D35105 Wind power generation	
Hydropower generation		D35106 Hydro power generation (incl. pump storage)	
Geothermal power generation		D35107 Geothermal power generation	
Bioenergy generation and production (including SAF)		D35108 Bio power generation	
Energy production from natural gas		D35101 Gas power generation	
Marine energy generation		D35109 Marine power generation	
Electricity generation from renewable non-fossil gaseous and liquid fuels		N/A	
Storage of electricity and thermal energy		D35111 Energy storage (not incl. pump storage)	
Transmission and distribution of energy		D35110 Transmission and distribution (incl.	

Thailand Taxonomy activities	ISIC Code	ANDBI	TSIC
		ICT and smart technology)	
Cogeneration of heating/cooling and power using renewable sources of energy		N/A	
Transmission and distribution networks for renewable and low-carbon gases	D352 - Manufacture of gas; distribution of gaseous fuels through mains H493 - Other land transport H 494 - Transport via pipeline	D35110 Transmission and distribution (incl. ICT and smart technology) D 35203 Gas distribution	D352 - Manufacture of gas; distribution of gaseous fuels through mains H493 - Other land transport H 494 - Transport via pipeline
Production of heating and cooling using waste heat	D353 - Steam and air conditioning supply	D35302 Provision of steam / air conditioning (renewable production)	D353 - Steam and air conditioning supply
Installation and operation of electric heat pumps			
Heating and cooling distribution			
Transportation sector			
Transport via railways	H491 - Transport via railways	H49101 Electrified rail and associated infrastructure	H491 - Transport via railways
		H49102 Low emission rolling stock	
		H49103 Improved railway efficiency measures	
Other passenger land transport	H492 - Other land transport	N/A	H492 - Transport via buses

Thailand Taxonomy activities	ISIC Code	ANDBI	TSIC
Urban and suburban passenger land transport			H493 - Other land transport (including 4931, 4932, 4933)
Freight transport by road			
Sea and coastal water transport	H501 - Sea and coastal water transport	H50101 Low emission fossil powered vessels	H501 - Sea and coastal water transport
		H50102 Electric vessels	
		H50103 Other low-emissions vessels	
Inland water transport	H502 - Inland water transport	H50201 Low emission fossil powered vessels	H502 - Inland water transport
		H50202 Electric vessels	
		H50203 Other low-emissions vessels	
Retrofitting of sea and coastal freight and passenger water transport	C3312 - Repair of machinery[34]	N/A	C3312 - Repair of machinery
Passenger and freight air transport	H51 – Air Transport	N/A	H51 – Air Transport
Enabling infrastructure for low-emission transport	Non-ISIC Transport Activities[35]	N/A	Non-ISIC Transport Activities
Agricultural sector			
Growing of perennial and non-perennial crops	A011 - Growing of Non-Perennial Crops;	N/A	A011 - Growing of non-perennial crops;

[34] An activity outside of chosen sectors is added due to its paramount importance to all other activities in the sector

[35] An activity outside of ISIC is added due to its paramount importance to all other activities in the sector

Thailand Taxonomy activities	ISIC Code	ANDBI	TSIC
	A012 - Growing of Perennial Crops		A012 - Growing of perennial crops
Sustainable sugarcane production	A012 - Growing of Perennial Crops		A0114- Growing of sugar cane
Sustainable rice production	A013 - Plant Propagation A011 - Growing of Non-Perennial Crops		A013 - Plant propagation A0112 - Growing of rice
Sustainable rubber trees production	A012 - Growing of Perennial Crops		A01291 - Growing of rubber trees
Sustainable oil palm production	C104 - Manufacture of Vegetable and Animal Oils and Fats		A01261 - Growing of oil palms
Sustainable cassava production	A012 - Growing of Perennial Crops		A01135 - Growing of cassava
Livestock production	A014 - Animal Production		A014 - Animal production
Sustainable aquaculture production	A032 - Aquaculture		A032 - Aquaculture
Sustainable forest management	A021 - Silviculture and Other Forestry Activities		A02 - Forestry and logging
Forestry plantation	A020 - Forestry and logging		A021 - Silviculture and other forestry activities
Conservation, restoration, and maintenance of natural forests	A024 - Support Services to Forestry		A024 - Support Services to Forestry
Construction and real estate sector			
Construction of new buildings	F410 - Construction of Buildings; F433 - Building Completion and Finishing; F439 - Other Specialised Construction Activities	410[001] Construction of new buildings; 410[002] Renovation of existing buildings;	F41 - Construction of Buildings; F433 - Building Completion and Finishing;
Renovation of the existing buildings			

Thailand Taxonomy activities	ISIC Code	ANDBI	TSIC
			F439 - Other Specialised Construction Activities
Acquisition or ownership of buildings	L681 - Real Estate Activities with Own or Leased Property; L682 - Real Estate Activities on a Fee or Contract Basis	681[001] Acquisition and ownership of buildings	L681 - Real Estate Activities with Own or Leased Property; L682 - Real Estate Activities on A Fee or Contract Basis
Installation, maintenance, and repair of special-purpose building equipment	F432 - Electrical, Plumbing and Other Construction Installation Activities	68[001] Electric vehicle charging stations 68[002] Energy efficient equipment 68[003] Energy performance measurement, regulation, control 68[004] Renewable Technologies	F432 - Electrical, Plumbing and Other Construction Installation Activities
Early warning systems	F432 - Electrical, Plumbing and Other Construction Installation Activities	68[005] Early Warning Systems	F432 - Electrical, Plumbing and Other Construction Installation Activities
Demolition and site preparation	F431 – Demolition and Site Preparation	431[001] Demolition and site preparation	F431 – Demolition and Site Preparation
Manufacturing sector			
Manufacture of cement	C239 - Manufacture of Non-Metallic Mineral Products Not Elsewhere Classified	N/A	C2394 - Manufacture of Cement, Lime, and Plaster
Manufacture of aluminum	C242 - Manufacture of Basic Precious and Other Non-Ferrous Metals; C243 - Casting Of Metals		C24202 - Manufacture of basic aluminium and aluminium products

Thailand Taxonomy activities	ISIC Code	ANDBI	TSIC
			C2432 - Casting of Non-Ferrous Metals
Manufacture of iron and steel	C241 - Manufacture of Basic Iron and Steel; C243 - Casting Of Metals		C241 - Manufacture of Basic Iron and Steel; C2431 - Casting of Iron and Steel
Manufacture of basic chemicals, e.g., carbon black, soda ash, chlorine, ethylene, propylene, butadiene, aromatics (acetylene, benzene, xylene, and toluene), nitric acid, methanol, anhydrous ammonia	C201 - Manufacture of Basic Chemicals, fertilisers and Nitrogen Compounds, Plastics, and Synthetic Rubber in Primary Forms		C201 - Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics, and synthetic rubber in primary forms
Manufacture of hydrogen			
Manufacture of plastics in primary form			
Manufacture of batteries	C272 - Manufacture of batteries and accumulators		C272 - Manufacture of batteries and accumulators
Manufacture of renewable energy technologies and products	Various codes		Various codes
Manufacture of low-carbon technologies for transport	Various codes		Various codes
Manufacture of energy efficiency equipment for buildings	Various codes		Various codes

Thailand Taxonomy activities	ISIC Code	ANDBI	TSIC
Manufacture of other low-carbon technologies	Various codes		Various codes
CCS/CCUS: Point-source capture of CO2	No code	X01 Carbon Capture, Utilisation and Storage (CCUS)	No code
Transportation of captured CO2	No code		No code
Permanent sequestration of captured CO2	No code		No code
Utilisation of captured CO2	No code	N/A	No code
Auxiliary transitional activity	No code	N/A	No code
Waste management sector			
Anaerobic digestion of sewage sludge	E370 - Sewerage	N/A	E370 - Sewerage
Anaerobic digestion or composting of bio-waste	E3821 - Treatment and disposal of non-hazardous waste		E3821 - Treatment and disposal of non-hazardous waste
Collection and transport of waste	E381 - Waste collection		E381 - Waste collection
Depollution and dismantling of end-of-life products	E383 - Materials recovery		E383 - Materials recovery
Waste to Energy	E382 - Waste treatment and disposal		E382 - Waste treatment and disposal
Landfill gas capture and utilisation	E3821 - Treatment and disposal of non-hazardous waste		E3821 - Treatment and disposal of non-hazardous waste
Remediation of contaminated sites and areas	E390 - Remediation activities and other waste management services, C332 - Installation of		E390 - Remediation activities and other waste management services, C332 -

Thailand Taxonomy activities	ISIC Code	ANDBI	TSIC
	industrial machinery and equipment, F431 - Demolition and site preparation, M711 - Architectural and engineering activities and related technical consultancy		Installation of industrial machinery and equipment, F431 - Demolition and site preparation, M711 - Architectural and engineering activities and related technical consultancy
Remediation of legally non-conforming landfills and abandoned or illegal waste dumps	E390 - Remediation activities and other waste management services, E382 - Waste treatment and disposal, E3822 - Treatment and disposal of hazardous waste		E390 - Remediation activities and other waste management services, E382 - Waste treatment and disposal, E3822 - Treatment and disposal of hazardous waste
Sorting and material recovery from non-hazardous waste	E383 - Materials recovery		E383 - Materials recovery
Treatment of hazardous waste	E3822 - Treatment and disposal of hazardous waste		E3822 - Treatment and disposal of hazardous waste
Construction, extension, upgrade, operation and renewal of urban wastewater collection and treatment	E370 - Sewerage		E370 - Sewerage
Construction, extension, upgrade and operation of centralised wastewater collection and treatment	E370 - Sewerage		E370 - Sewerage

Thailand Taxonomy activities	ISIC Code	ANDBI	TSIC
Renewal of centralised wastewater collection and treatment	E370 - Sewerage		E370 - Sewerage
Phosphorus recovery from wastewater	E383 - Materials recovery, E370 - Sewerage		E383 - Materials recovery, E370 - Sewerage

Annex 2: Thailand Taxonomy and other taxonomies mapping

Table below provides a list of activities in the Taxonomy compared with activities from other benchmark taxonomies. (ASEAN, Singapore, and the European Union), as well as with the decarbonisation criteria of the Climate Bonds Initiative. The latter is used as a scientific benchmark for the Thailand Taxonomy Technical Screening Criteria (TSC) as Climate Bonds criteria are developed using the latest climate science, are regularly updated, and are not subject to distortions due to political or private sector influence. Please refer to the Climate Bonds Initiative's website[36] to learn more about how the criteria have been designed and developed.

Table 10 The correspondence of the Thailand Taxonomy activities to the activities in other national and international taxonomies

Thailand Taxonomy	EU Taxonomy[37]	Singapore Taxonomy[38]	ASEAN Taxonomy[39]	Climate Bonds Criteria[40]
Energy sector				
Solar energy generation	Electricity generation using concentrated solar power (CSP) technology and solar photovoltaic technology	Electricity generation using solar PV and CSP (including electricity, heat, cool)	Electricity generation using CSP technology and solar photovoltaic technology	Solar Energy[41]
Wind energy generation	Electricity generation from wind power	Electricity generation from wind power	Electricity generation from wind power	

[36] Climate Bonds Initiative, "Governance," July 31, 2018, https://www.climatebonds.net/standard/governance

[37] European Commission. "EU Taxonomy Navigator.", n.d., https://ec.europa.eu/sustainable-finance-taxonomy/home

[38] Monetary Authority of Singapore, "Singapore-Asia Taxonomy for Sustainable Finance," 2023, https://www.mas.gov.sg/-/media/mas-media-library/development/sustainable-finance/singaporeasia-taxonomy-updated.pdf

[39] ASEAN, "Asean Taxonomy Version 3," December, 2024, https://asean.org/wp-content/uploads/2024/03/ASEAN-Taxonomy-Version-3.pdf.

[40] Climate Bonds Initiative. "Climate Bonds Taxonomy," May 3, 2023, https://www.climatebonds.net/standard/taxonomy

[41] Climate Bonds Initiative. "Solar power". https://www.climatebonds.net/standard/solar

Thailand Taxonomy	EU Taxonomy[37]	Singapore Taxonomy[38]	ASEAN Taxonomy[39]	Climate Bonds Criteria[40]
Hydropower generation	Electricity generation from hydropower	Electricity generation from hydropower	Electricity generation from hydropower	Hydropower[42]
Geothermal power generation	Electricity generation from geothermal power	Electricity generation from geothermal energy	Electricity generation from geothermal energy	Geothermal Energy[43]
Bioenergy generation and production	Electricity generation from bioenergy	Electricity generation from bioenergy power	Electricity generation from bioenergy, including co-firing with fossil fuels	
Energy production from natural gas	Electricity generation from fossil gaseous fuels	Electricity generation from fossil gaseous fuels	Electricity generation from fossil gas	
Marine energy generation	Electricity generation from ocean energy technologies	Electricity generation from ocean energy	Electricity generation from ocean energy	Marine Renewable Energy[44]
Electricity generation from renewable non fossil gaseous and liquid fuels, including low carbon hydrogen	Electricity generation from renewable non-fossil gaseous and liquid fuels	Electricity generation from hydrogen or its derivatives (e.g. ammonia)	Electricity generation from renewable non-fossil gaseous and liquid fuels, including co-firing with fossil fuels	
Cogeneration of heating/cooling and power using renewable sources of energy	Cogeneration of heat/cool and power from renewable non-			

[42] Climate Bonds Initiative. "Hydropower". https://www.climatebonds.net/standard/hydropower

[43] Climate Bonds Initiative. "Geothermal Energy". https://www.climatebonds.net/standard/geothermal

[44] Climate Bonds Initiative. "Marine Renewable Energy". https://www.climatebonds.net/standard/marine

Thailand Taxonomy	EU Taxonomy[37]	Singapore Taxonomy[38]	ASEAN Taxonomy[39]	Climate Bonds Criteria[40]
	fossil gaseous and liquid fuels			
Production of heating and cooling using waste heat	Production of heating and cooling using waste heat	Production of heat or cool from waste heat	Production of heating/cooling using waste heat)	
Installation and operation of electric heat pumps	Installation and operation of electric heat pumps		Production of heating / cooling using electric heat pump	
Heating and cooling distribution	District heating/cooling distribution	District heating and cooling systems	District heating/cooling distribution	
Transmission and distribution networks for renewable and low-carbon hydrogen	Transmission and distribution networks for renewable and low-carbon gases	Transmission and distribution networks for renewable and low-carbon gases	- Transmission and distribution (incl. ICT and smart technology) - Gas distribution	
Storage of electricity, thermal energy and low-carbon hydrogen	Storage of electricity, thermal energy and hydrogen	Storage of electricity, hydrogen or its derivatives	- Storage of electricity, including pumped storage - Storage of renewable and low-carbon gases	Electrical Grids and Storage[45]
Transmission and distribution of electricity	Transmission and distribution of electricity	Transmission and distribution of electricity	Transmission and distribution (incl. ICT and smart technology)	
Transportation sector				

[45] Climate Bonds Initiative. https://www.climatebonds.net/standard/electrical-grids-and-storage

Thailand Taxonomy	EU Taxonomy[37]	Singapore Taxonomy[38]	ASEAN Taxonomy[39]	Climate Bonds Criteria[40]
Transport via railways	Freight rail transport	Transport via railways	- Passenger interurban rail transport - Freight rail transport	Low Carbon Transport[46]
Other passenger land transport	Freight transport services by road	Other passenger land transport	Transport by motorbikes, passenger cars and light commercial vehicles	
Urban and suburban passenger land transport	Urban and suburban transport, road passenger transport	Urban and suburban passenger land transport	Urban and suburban transport, road passenger transport	
Freight transport by road	Freight transport services by road	Freight transport by road	Freight transport services by road	
Sea and coastal water transport	- Sea and coastal freight water transport, vessels for port operations and auxiliary activities, - Sea and coastal passenger water transport	Sea and coastal water transport	- Sea and coastal freight water transport, vessels for port operations and auxiliary activities - Sea and coastal passenger water transport	
Inland water transport	Inland freight water transport, Inland passenger water transport	Inland water transport	Inland passenger water transport	
Retrofitting of sea and coastal freight	Retrofitting of sea and coastal freight		Retrofitting of sea and coastal freight	

[46] Climate Bonds Initiative. https://www.climatebonds.net/standard/transport

Thailand Taxonomy	EU Taxonomy[37]	Singapore Taxonomy[38]	ASEAN Taxonomy[39]	Climate Bonds Criteria[40]
and passenger water transport	and passenger water transport		and passenger water transport	
Passenger and freight air transport	Passenger and freight air transport,	Air transport		
	Leasing of aircraft			
	Air transport ground handling operations			
	Airport infrastructure		Airport infrastructure, including low-carbon assets and facilities	
Enabling infrastructure for low-emission transport	Low carbon airport infrastructure	Low-carbon transport infrastructure	Infrastructure for road and public transportation, including infrastructure to enable low-carbon land transport	
	Infrastructure enabling low carbon water transport, road transport and public transport			
Agricultural sector				
Growing of perennial and non-perennial crops		Perennial and non-perennial crops		Climate Bonds Agricultural Criteria[47]
Sustainable sugarcane production				

[47] Climate Bonds Initiative, "Agriculture Criteria – Climate Bonds Standard & Certification Scheme," June, 2021, https://www.climatebonds.net/files/files/standards/agriculture/Agriculture%20Criteria%2020210622v3.pdf

Thailand Taxonomy	EU Taxonomy[37]	Singapore Taxonomy[38]	ASEAN Taxonomy[39]	Climate Bonds Criteria[40]
Sustainable rice production				
Sustainable rubber trees production				
Sustainable oil palm production				
Sustainable cassava production				
Livestock production		Animal production		
Sustainable aquaculture production				
Sustainable forest management	Forest management	Sustainable forest management		Climate Bonds Forestry Criteria[48]
Forestry plantation	Afforestation	Forestry plantation		
Conservation, restoration, and maintenance of natural forests	Rehabilitation and restoration of forests, including reforestation and natural forest regeneration after an extreme event Forest management Conservation forestry	Conservation, restoration, and maintenance of natural/pristine forests		
Construction and real estate sector				

[48] Climate Bonds Initiative, "Forestry Criteria – Climate Bonds Standard & Certification Scheme," November, 2018, https://www.climatebonds.net/files/files/standards/Forestry/Crit%20Forestry%20Criteria%20document_July%202020.pdf

Thailand Taxonomy	EU Taxonomy[37]	Singapore Taxonomy[38]	ASEAN Taxonomy[39]	Climate Bonds Criteria[40]
Construction of new buildings	Construction of new buildings	Construction of new buildings	Construction of new buildings	Climate Bonds Buildings Criteria[49]
Renovation of the existing buildings	Renovation of existing buildings	Renovation of existing buildings	Renovation of existing buildings	
Acquisition or ownership of buildings	Acquisition and ownership of buildings	Acquisition or ownership of buildings	Acquisition and ownership of buildings	
Installation, maintenance, and repair of special-purpose building equipment	- Installation, maintenance, and repair of energy efficiency equipment - Installation, maintenance, and repair of charging stations for electric vehicles in buildings (and parking spaces attached to buildings) - Installation, maintenance and repair of instruments and devices for measuring, regulating, and controlling energy performance of buildings	Installation, maintenance, and repair of equipment	- Energy efficient equipment; - Energy performance measurement, regulation, control; - Renewable Technologies; - Early Warning Systems	

[49] Climate Bonds Initiative, "Buildings Criteria – Climate Bonds Standard & Certification Scheme," December 2023, https://www.climatebonds.net/files/files/sector-criteria-buildings-criteria-v2-1-dec2023.pdf

Thailand Taxonomy	EU Taxonomy[37]	Singapore Taxonomy[38]	ASEAN Taxonomy[39]	Climate Bonds Criteria[40]
Demolition and site preparation	Demolition and wrecking of buildings and other structures		Demolition and site preparation	Asean Taxonomy[50]
Early Warning Systems			Early Warning Systems	
Manufacturing sector				
Manufacture of cement	Manufacture of cement	Manufacture of cement		Climate Bonds Cement Criteria[51]
Manufacture of aluminum	Manufacture of aluminum	Manufacture of aluminum		
Manufacture of iron and steel	Manufacture of iron and steel	Manufacture of basic iron and steel		Climate Bonds Steel Criteria[52]
Manufacture of hydrogen	Manufacture of hydrogen	Manufacture of hydrogen		Climate Bonds Hydrogen Criteria[53]
Manufacture of basic chemicals		Manufacture of basic chemicals		Climate Bonds Basic Chemicals Criteria[54]
- Carbon black	Manufacture of carbon black			

[50] ASEAN Taxonomy Board (ATB), "ASEAN Taxonomy for Sustainable Finance Version 3," April 25, 2024, https://www.theacmf.org/images/downloads/pdf/ASEAN-Taxonomy-Version-3.pdf

[51] Climate Bonds Initiative, "Cement Criteria – Climate Bonds Standard & Certification Scheme," April 2023, https://www.climatebonds.net/files/files/standards/Cement/Sector%20Criteria%20-%20Cement%20Production%20v1_2%20%28April%202023%29%281%29.pdf.

[52] Climate Bonds Initiative, "Steel Criteria – Climate Bonds Standard & Certification Scheme," May 2023, https://www.climatebonds.net/files/files/Climate%20Bonds%20Steel%20Criteria.pdf

[53] Climate Bonds Initiative, "Hydrogen Criteria – Climate Bonds Standard & Certification Scheme," November 2023, https://www.climatebonds.net/files/files/criteria-document-hydrogen-production-and-delivery-criteria-final-for-publication.pdf

[54] Climate Bonds Initiative, "Basic Chemicals Criteria – Climate Bonds Standard & Certification Scheme," April 2023, https://www.climatebonds.net/files/files/standards/Chemicals%20-%20Basic/Sector%20Criteria%20-%20Basic%20Chemicals%20%28April%202023%29.pdf

Thailand Taxonomy	EU Taxonomy[37]	Singapore Taxonomy[38]	ASEAN Taxonomy[39]	Climate Bonds Criteria[40]
- Soda ash	Manufacture of soda ash			
- Chlorine	Manufacture of chlorine			
- Ethylene, propylene, butadiene	Manufacture of organic basic chemicals			
- Aromatics (acetylene, benzene, xylene, and toluene)				
- Anhydrous ammonia	Manufacture of anhydrous ammonia			
- Nitric acid	Manufacture of nitric acid			
- Ethanol				
Manufacture of plastics in primary form	Manufacture of plastics in primary form	Manufacture of plastics in primary form		
Manufacture of batteries	Manufacture of batteries	Manufacture of batteries		
Manufacture of renewable energy technologies and products	Manufacture of renewable energy technologies	Manufacture of renewable energy technologies 4.9. Manufacture of equipment for the production of hydrogen through electrolysis		
Manufacture of low-carbon technologies for transport	Manufacture of low-carbon technologies for transport	Manufacture of low-carbon technologies for transport		

Thailand Taxonomy	EU Taxonomy[37]	Singapore Taxonomy[38]	ASEAN Taxonomy[39]	Climate Bonds Criteria[40]
Manufacture of energy efficiency equipment for buildings	Manufacture of energy efficiency equipment for buildings	Manufacture of energy efficiency equipment for buildings		
Manufacture of other low-carbon technologies	Manufacture of other low-carbon technologies	Manufacture of other low-carbon technologies for the household sector		
CCS/CCUS: Point-source capture of CO2		Point-source capture of CO2		
Transportation of captured CO2	Transport of CO2	Transportation of captured CO2	000[010] Transport of CO2	
Permanent sequestration of captured CO2	Underground permanent geological storage of CO2	Permanent sequestration of captured CO2	000[020] Underground permanent geological storage of CO2	
Utilisation of captured CO2				
Auxiliary transitional activity				
Waste management sector				
Anaerobic digestion of sewage sludge	Anaerobic digestion of sewage sludge	Biowaste treatment: anaerobic digestion		Climate Bonds Waste management[55]
Anaerobic digestion or composting of bio-waste	Anaerobic digestion or composting of bio-waste	Biowaste treatment: composting of biowaste		

[55] Climate Bonds Initiative, "Waste Management Criteria", August 2022, https://www.climatebonds.net/files/files/Waste%20Management%20Criteria_August2022.pdf

Thailand Taxonomy	EU Taxonomy[37]	Singapore Taxonomy[38]	ASEAN Taxonomy[39]	Climate Bonds Criteria[40]
Collection and transport of waste	Collection and transport of non-hazardous waste	Collection and transport of non-hazardous waste		
Depollution and dismantling of end-of-life products	Material recovery from non-hazardous waste	Material recovery facilities		
Waste to Energy	N/A	Waste to Energy (Incineration)		Climate Bonds Waste management[56]
Landfill gas capture and utilisation	Landfill gas capture and utilisation	Landfill gas capture and utilisation		
Remediation of contaminated sites and areas	Remediation of contaminated sites and areas	N/A		
Remediation of legally non-conforming landfills and abandoned or illegal waste dumps	Remediation of legally non-conforming landfills and abandoned or illegal waste dumps	N/A		
Sorting and material recovery from non-hazardous waste	Sorting and material recovery of non-hazardous waste	N/A		
Treatment of hazardous waste	E3822 - Treatment and disposal of hazardous waste	N/A		
Construction, extension,	Construction, extension and	N/A		

[56] Ibid.

Thailand Taxonomy	EU Taxonomy[37]	Singapore Taxonomy[38]	ASEAN Taxonomy[39]	Climate Bonds Criteria[40]
upgrade, operation and renewal of urban wastewater collection and treatment	operation of wastewater collection and treatment			
Construction, extension, upgrade and operation of centralised wastewater collection and treatment	Construction, extension and operation of wastewater collection and treatment	N/A		
Renewal of centralised wastewater collection and treatment	Renewal of wastewater collection and treatment	N/A		
Phosphorus recovery from wastewater	Phosphorus recovery from wastewater	N/A		