Thailand Climate Finance Tracker Methodology

July 2025

CFNT
Climate Finance Network Thailand

Acknowledgement

Climate Finance Network Thailand (CFNT) developed the Thailand Climate Finance Tracker (first published in July 2025) as a bottom-up attempt to systematically map climate finance flows, with the goal of enhancing transparency, alignment, and policy relevance to support tangible climate action in Thailand. This effort would not have been possible without the tremendous support and collaboration of our partners and a multitude of other individuals whose invaluable support has contributed to this initiative.

In this initiative, CFNT adopted the Climate Policy Initiative's (CPI) methodology to track climate finance flows, both mitigation and adaptation, and applied the Tailwind Taxonomy (under Creative Commons BY-NC 4.0 license) as the guiding framework for classifying climate adaptation finance. Regarding the datasets, CFNT is grateful to have received data from the Asian Development Bank on the aggregated climate finance flows in Thailand by multilateral development finance institutions.

CFNT would also like to extend our sincere appreciation to the Puey Ungphakorn Institute for Economic Research (PIER) for assisting us in the preparation of climate adaptation finance tracker. We are deeply grateful for PIER's technical expertise, data contributions, and valuable insights shared throughout the development process, which have significantly strengthened this initiative. This effort was undertaken collaboratively, and the resulting climate adaptation dataset will be jointly maintained by both organizations.

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1. Background, Objectives, and Key Methodologies

1.1 Background and Objectives

Thailand is facing a variety of climate change risks and impacts. For example, the forecasted cumulative damage from 2011 to 2045 is between THB 17,912 – 83,826 million per year for the agricultural sector alone (UNDP, 2024). The country is also ranked 30th in the list of countries that are most vulnerable to climate change, (Germanwatch, 2025). A 30% reduction in carbon emissions by 2030 requires cutting 290 million tons of carbon dioxide equivalent (CO_2e), with an estimated investment of THB 5 trillion in climate finance. A 40% reduction would require cutting 342 million tons of CO_2e and approximately THB 7 trillion in investment (Department of Climate Change and Environment, 2024). However, climate finance growth is not sufficient nor consistent across sectors and regions. Previous studies also showed that adaptation finance continues to lag, especially in developing countries (Climate Policy Initiative, 2023).

As of July 2025, comprehensive climate finance data is still unavailable for Thailand. CFNT believes that compiling such data from various publicly available sources into a public and easily accessible "tracker" would assist policymakers in identifying the gap between existing climate finance flows and demands, as well as enabling better allocation of funds into the most urgently needed sectors and sub-sectors.

The Thailand Climate Finance Tracker ("Tracker"), pioneered by Climate Finance Network Thailand (CFNT), aims to compile data on primary financing that supports both climate mitigation and climate adaptation activities in Thailand, and present the flows in a publicly accessible format. It provides a systematic categorization of financial flows into mitigation and adaptation finance, distinguishing between public and private sources, and identifying solutions or end-use sectors such as energy, transport, agriculture, infrastructure, and health. The Tracker serves as a starting point for mapping the landscape of climate finance in Thailand, and CFNT intends to update the data on an annual basis.

The Thailand Climate Finance Tracker explores 5 key areas of climate finance:

1. **The extent of climate finance in Thailand**
   The tracker aims to explore how much financial investment is directed towards climate change mitigation and adaptation activities in Thailand; for example, reducing emissions, enhancing greenhouse gas sinks, and utilizing adaptive solutions to reduce vulnerability from climate change impacts.
2. **Sources and Intermediaries**
   The tracker endeavors to classify organizations that are sources or intermediaries of capital for climate finance in Thailand. The sources and intermediaries of capital for climate finance may originate from either public or private entities and can be domestic or international in nature.
3. **Instruments**
   Financial instruments are the means through which investment is structured and deployed across climate-related activities. Each feature distinct financial characteristics, risk profiles, and implications for leverage and impact. The Tracker seeks to identify the full range of financial instruments being utilized to support climate-related activities in Thailand.
4. **Use of Financing**
   As climate finance supports a broad range of climate-related activities aimed at mitigating greenhouse gas emissions and enhancing resilience to climate change impact through adaptation, the Tracker seeks to record the total amount of announced investments in mitigation and adaptation activities in Thailand.

5. **Sectors and Sub-sectors**
   Different sectors for both mitigation and adaptation — such as energy, transport, agriculture, and water — face unique climate challenges and opportunities. Identifying sector-specific flows would enable more targeted and effective interventions to enable tangible transition and outcomes. The Tracker traces different themes, sectors, and sub-sectors that climate finance flows have been committed to supporting climate mitigation and adaptation efforts.

1.2 Climate Finance Definition

Climate finance refers to funding—whether local, national, or international—mobilized from public, private, or alternative sources to support actions that address **climate change through mitigation and adaptation** (UNFCCC, n.d.) This funding can come from a variety of channels, including national governments, international institutions, private investors, and philanthropic organizations. It can take many forms, such as grants, green bonds, equity investments, debt swaps, guarantees, or concessional loans. Climate finance may be directed toward a wide range of activities, from reducing greenhouse gas emissions to enhancing climate resilience and adaptive capacity (UNDP, 2023).

To establish a common understanding, we draw on a range of sources to define climate mitigation and adaptation, as outlined below. We aim to ensure a clear distinction between the two categories. As such, the first iteration (July 2025) of Thailand Climate Finance Tracker excludes the category of dual-benefit climate finance—activities that contribute to both mitigation and adaptation objectives (Climate Policy Initiative, 2025).

1.2.1 Climate change mitigation

Based on the Handbook on the OECD-DAC Rio Markers for Climate Change, the Joint MDB approach for the type of activity captured (i.e. projects or projects components, sub-components or elements within projects that provide mitigation and/or adaptation co-benefits), the Climate Bonds Initiative Taxonomy, and EU Taxonomy, the definition of climate change mitigation is an activity that **(1) contributes to reducing or avoiding greenhouse gas (GHG) emissions; or (2) enhances GHGs sequestration through the enhancement of carbon sinks and reservoirs.**

This comprises a range of activities from information and knowledge generation to capacity development, planning, and the implementation of climate change mitigation actions/investments. To be qualified as 'climate change mitigation', the eligibility criteria of climate change mitigation activity, projects or projects components, sub-components or elements, must contribute to:

a) the mitigation of climate change by limiting anthropogenic emissions of GHGs, including gases regulated by the Montreal Protocol; or
b) the protection and/or enhancement of GHG sinks and reservoirs; or
c) the integration of climate change concerns with the recipient countries' development objectives through institution building, capacity development, strengthening the regulatory and policy framework or research (excluding R&D for manufacturing of technologies).

It is also important to note that the definition of climate change mitigation excludes investment in renewable energy manufacturing technologies, e.g. wind turbines.

1.2.2 Climate change adaptation

Based on the Handbook on the OECD-DAC Rio Markers for Climate Change, the Joint MDB approach for the type of activity captured (i.e. projects or projects components, sub-components or elements within projects that provide mitigation and/or adaptation co-benefits), the Climate Bonds Initiative Taxonomy, EU Taxonomy, and Tailwind Taxonomy, an activity classifies as 'climate change adaptation' if it **aims to reduce the vulnerability of human or natural systems to the impacts of climate change and climate-related risks, by maintaining or increasing adaptive capacity and resilience.** This comprises a range of activities from information and knowledge generation to capacity development, planning, and the implementation of climate change adaptation actions/investments.

To be qualified as a 'Climate Change Adaptation,' an activity – projects or components, sub-components or elements – must demonstrate that it can contribute to addressing the specific vulnerabilities to climate change and climate-related risk relevant to the project and its context or location by:

a) Setting out the context of climate vulnerability using a robust evidence-based analysis (e.g. via vulnerability assessment analysis carried out as part of project preparation or existing studies); and
b) Making an explicit statement of intent to address climate vulnerability as part of the project; and
c) Framing a clear and direct link between the climate vulnerability context and the specific project activities: i.e. through e.g. an analysis of the activities planned by the project in the light of a positive list of actions that can contribute to reducing vulnerability, or to strengthening the resilience of communities, goods or ecosystems to climate change.

The Thailand Climate Finance Tracker seeks to differentiate between eligible and ineligible climate finance flows using a set of overarching principles, which are detailed in the following section. While every effort is made to ensure consistency and coherence in the data presented within the Tracker, CFNT does not independently perform auditing or verification of the application of climate finance definitions by data providers and funders; rather, it relies on the information as disclosed by each source.

1.3 Key Referenced Methodologies

After establishing a clear definition of climate finance, the subsequent step involves selecting appropriate methodologies to systematically categorize investments associated with climate mitigation and adaptation finance efforts.

The Tracker aims to compile data on primary financial flows that directly support climate change mitigation and adaptation action in Thailand. To ensure methodological rigor and contextual relevance, the team draws upon established frameworks from globally recognized sources to inform its classification systems and data collection procedures, with adaptations made to suit Thailand's context.

The main methodology used in classification of activities in the Tracker is grounded in Climate Policy Initiative (CPI)'s comprehensive analytical frameworks, notably the Global Landscape of Climate Finance reports and the Climate Finance Roadmaps. These frameworks provide a granular analysis of climate finance flows, identifying sources, sectors, and geographies of investment. Although CPI offers a robust framework for tracking climate finance flows, its sectoral classification and dimension focus remain limited in scope. To address this, the Tracker adopts a dual-framework approach—utilizing the Climate Policy Initiative's methodology for climate mitigation and the Tailwind Taxonomy for climate adaptation.

1.3.1 Referenced methodology for climate mitigation finance

Mitigation finance within the Climate Finance Tracker is guided primarily by the methodology developed by the Climate Policy Initiative (CPI), which provides a robust and widely recognized framework for tracking climate-related financial flows.

CPI is a globally recognized research and advisory organization specializing in finance and policy, best known for its leadership in tracking global climate finance flows reports. These reports provide one of the most comprehensive and widely cited overviews of climate finance, offering methodological frameworks, classifications, and data collection approaches that are used by governments, development banks, and research institutions across the globe.

While CPI's approach forms the foundation of definitions, data collection processes, and scope of accounting of climate finance, the Tracker also incorporates definitions from a range of credible and internationally trusted sources such as OECD, CBI, and EU Taxonomy as mentioned earlier. This blended approach ensures methodological consistency while also allowing for flexibility and relevance to the Thai context, particularly in cases where localized interpretation or sector-specific nuances are necessary.

CPI divides all climate mitigation activities into 7 sectors – energy systems, transport, industry, waste & wastewater, building & infrastructure, and information and communications technology. Given wider sector coverage under CPI's sector classification compared to Thailand's NDC action plans, CFNT has mapped CPI's sector criteria with Thailand's NDC action plans and key activities to align with Thailand's nationally defined priorities and targets (see Section 4.2 of this Methodology). It is important to note that this mapping is intended to serve as a general guide rather than a definitive classification. It should be used as a reference, with the understanding that some alignment decisions may involve interpretations.

1.3.2 Referenced methodology for climate adaptation finance

Recognizing the close conceptual overlap between climate change adaptation and climate resilience, the Thailand Climate Finance Tracker aims to incorporate both dimensions within its framework. Due to the limited social dimension and sectoral coverage in CPI's classification system, the Tracker adopts the Tailwind Taxonomy as a more comprehensive alternative for identifying and categorizing adaptation-related financial flows.

Tailwind is a mission-driven venture fund and ecosystem builder dedicated to accelerating the growth and implementation of solutions that enhance climate adaptation and resilience. Tailwind Taxonomy is an impact-led classification framework to categorize and track climate adaptation finance with social and resilience focus across sectors, which makes it distinctive from other climate adaptation classifications. Tailwind Taxonomy offers a structured and transparent framework for identifying, classifying, and tracking investments that support climate adaptation and resilience activities. Designed with practical application in mind, Tailwind Taxonomy has undergone peer review by a broad network of investors and philanthropic organizations to ensure its practicality and comprehensiveness and has been released for public use under Creative Commons BY-NC 4.0 license.

Tailwind Taxonomy categorizes climate adaptation and resilience activities into 8 themes and 35 sectors which are aligned with global goals on adaptation and Sustainable Development Goals. Compared to Thailand's focused sectors on climate adaptation, Tailwind's coverage is wider than the sectors under Thailand's National Adaptation Plan 2024 (NAP 2024) as Tailwind Taxonomy also includes climate resilience and place more emphasis on social dimensions.

For ease of reference, CFNT has provided a mapping between sectors in the NAP 2024 and Tailwind Taxonomy (see Section 4.2 of this Methodology). The mapping is intended to serve as a guiding framework and does not represent a definitive or authoritative classification. It should be interpreted as a reference tool, acknowledging that some alignment decisions may involve a degree of subjectivity and may not fully capture all sectoral nuances.

2. Data Collection: Guiding Principles and Scope

2.1 Guiding Principles of Data Collection

The guiding principles for data collection are developed to provide a foundational framework to ensure that data is gathered in a consistent and comparable way across both public and private sectors. By adhering to these principles, we aim to enhance data trustworthiness, enable meaningful comparisons, and ensure that the insights drawn are robust, reliable, and reflective of the realities of climate finance commitments they intend to capture.

In doing so, we adhere to the following core principles described in CPI's methodology to ensure consistency in data collection and reporting. These principles guide the collection of data related to financial flows for both climate mitigation and adaptation. We apply CPI's guiding principles while tailoring our approach in each principle to reflect the characteristics of data availability in the Thai context.

1. **Avoid double counting:** Double counting occurs when certain climate finance flows are recorded multiple times. Following CPI's methodology, the Thailand Climate Finance Tracker compares the overlapping sources based on their credibility and level of detail, retaining only the most robust and comprehensive entry for each suspected duplicated transaction.

2. **Focus on primary investment:** The Tracker records newly committed investments that directly support or enable climate mitigation and adaptation efforts within the country. In line with CPI's methodology, the tracker excludes any financial flows that do not represent new investments targeting climate-related outcomes—such as transactions in secondary markets, refinancing, and the transfer of ownership of existing assets. For example, in the case of new multi-year projects, we record the full amount in the year that they were committed.

3. **Exclude flows that support carbon emissions lock-in:** Carbon lock-in occurs when fossil-fuel based infrastructure or assets remain in operation, although low-emissions alternatives are available and could be deployed. Therefore, to be in line with the rationale of climate mitigation aiming to substantially contribute to the reduction of GHG emissions, the Tracker excludes climate finance flows that are directed to support carbon emission lock-in transactions. Examples of such transactions include fossil fuel-related transactions, even those that involve lower-carbon or energy-efficient technologies, such as upgrades to improve the efficiency of coal-fired power plants.

4. **Maximize granularity of data:** Following CPI's principles, the Tracker collects data at **project level if possible** as project level data tends to provide more reliable details on project objectives and use of funds. Information is carefully reviewed to ensure consistency in key details such as the actors involved, financial instruments, and recipient sectors. In cases where project data is not feasible to collect or report, we use data at an aggregate level.

5. **Include tangible financial commitments:** Although disbursements offer more accurate snapshot, consistent and comprehensive disbursement data is often unavailable across different actors in Thailand. Therefore, the Tracker emphasizes financial commitments.

6. **Lean toward conservativeness:** The Tracker adopts CPI's conservative reporting approach where it is opting to under-report rather than risk overestimating climate finance. This guiding principle

helps us navigate the challenges of data collection in Thailand, where detailed project information is often limited.

2.2 Scope of Accounting of Climate Finance

For the Tracker, its scope of accounting of climate finance follows the definitions of sources of funds and financial instruments described in CPI's methodology on Global Landscape of Climate Finance 2023. We added examples of sources and instruments that are in line with market context in Thailand.

2.2.1 Source of Fund Type

Climate finance funding sources can be categorized into two main types: (1) public climate finance and (2) private climate finance.

2.2.1.1 Public climate finance

Public climate finance refers to funds provided by government bodies, multilateral development banks, national and multilateral climate funds, state-owned enterprises and financial institutions, and international financial institutions (Climate Policy Initiative, 2023). These funds are typically directed through official development assistance (ODA), concessional loans, grants, or public investment programs, often aimed at supporting developing countries in achieving their climate mitigation and adaptation goals.

Referring to CPI's classification of source of fund type, the actors which engage with public climate finance flows are identified in the Tracker as follows:

- **Government** refers to domestic funding provided through public budgets by central, provincial, or local authorities and their agencies.
    - **Central government and their agencies** are sources of domestic financing through the public budget carried out by Thailand's central government and ministries.
    - **Local government and their agencies** include provincial and municipal offices responsible for managing budget ordinances, such as allocations from Provincial Administrative Organizations.
- **Domestic public funds** include public funds that are funded by taxpayers or other public sources.
- **Multilateral climate funds** include commitments from multilateral climate funds' own resources only.
- **Development finance institutions (DFIs)** refer to commitments from development finance institutions in 3 categories:
    - **Multilateral DFIs**: Development Finance Institutions chartered by multiple countries.
    - **Bilateral DFIs:** An institution under the ownership of one country that facilitates the flow of finance to other countries.
    - **National DFIs:** Development finance institutions where a single country owns the institution and finance is directed domestically. They differ from state-owned financial institutions due to the specific development mandate in their operations. Examples of national DFIs in Thailand include the Government Housing Bank and Bank of Agriculture and Agricultural Cooperatives (BAAC).

- **State-owned bank:** Commercial bank where the majority of shares are owned by a government and/or public organization. Example of a state-owned bank in Thailand is Krungthai Bank.

- **State-owned enterprise**: Institutions or organizations that are at least the majority owned by a government or government agency.

2.2.1.2 Private climate finance

Private climate finance originates from commercial financial institutions, corporations, investors, and other non-state actors (Climate Policy Initiative, 2023). It includes investments aligned with clear climate-related objectives through mechanisms such as green bonds and blended finance.

Following CPI's classification of financing types which is determined by the institutional actors involved, private climate finance flows are categorized as follows:

- **Commercial banks** include providers of private debt capital (and occasionally other instruments), including commercial and investment banks.
- **Corporations** include corporations and project developers which operate in covered sectors and activities.
- **Impact investors** include foundations and other nonprofits identified via the Revenue Department's registry of tax-deductible charitable organizations and known philanthropic organizations in Thailand.
- **Institutional investors** include insurance companies, asset management firms, pension funds, private equity, venture capital, and infrastructure funds.
- **Households / Individuals** refers to family-level economic entities, which includes high-net-worth individuals and their intermediaries (e.g. family offices investing on their behalf).

2.2.2 Financial Instruments

Referring to CPI's framework for accounting climate finance through financial instruments, the Tracker includes the following components:

- **Grants:** Transfers provided in the form of cash, goods or services that do not require repayment.
- **Project level subsidized debt:** Loans provided under conditions more favorable than standard market terms are included in this category[1].
- **Project level Debt:** Loans provided with regular market conditions.
- **Project Level Equity:** A stock or any other security that represents an ownership interest.
- **Balance Sheet Financing:** Investment made directly by a firm or financial institution.

The Tracker also follows CPI's methodology in its treatment of risk management instruments, such as guarantees and insurance. Such instruments are excluded from the dataset as their actual disbursements or activation depend on uncertain future events that may not occur, meaning that there is a possibility that no actual financial flows will take place.

[1] This encompasses concessional loans and Official Development Assistance (ODA) loans—defined as loans offered on significantly more generous terms than those available commercially. Concessionality may be reflected through below-market interest rates, extended maturity periods, longer grace periods, or a combination of these features. Such loans often include lengthy grace periods. As defined by the OECD, ODA loans must contain a minimum grant element of 25%.

Additionally, it is important to acknowledge that the observed distribution of climate finance across various financial instruments may not accurately represent actual allocations, as the classification is dependent on the scope, reliability, and granularity of the available data sources.

3. Data Sources and Assumptions

The July 2025 iteration of Thailand Climate Finance Tracker dataset covers climate mitigation and adaptation finance commitments for the country between 2018 through May 2025. This chapter provides key data sources used to track climate commitment as well as data assumptions and limitations.

3.1 Key Data Sources

Key data sources are categorized by sources of fund tracked which are listed in Table 1 below.

Table 1: Key Data Sources Used in Thailand Climate Finance Tracker (Tracked during 2018 – May 2025)

Source of Fund	Source of Data	Data granularity
Government	Federal government: Official government budget for climate change mitigation and adaptation projects funded by the central government (Annual appropriations)	Project level
	Local governments: Provincial budgets and Public Administrative Organization's ordinances	Project level
Domestic Public Funds	• Energy Conservative Promotion Fund • Environment Fund • Thai Climate Initiative (Thai CI)	Project level
Multilateral Climate Funds	• Data collected by Asia Development Bank (ADB) and • Projects reported by the institutions e.g. Adaptation Fund, Green Climate Fund (GCF), and Climate Investment Fund (CIF)	National aggregate (ADB) and Project level
Multilateral Development Finance Institutions	• Data collected by ADB • Projects reported by the institutions e.g. Global Environment Facility, Food and Agriculture Organization (FAO)	National aggregate (ADB) and project level

Source of Fund	Source of Data	Data granularity
Corporations and State-owned enterprises (SOEs)	• Database of registered carbon credit projects at Thailand Greenhouse Gas Management Organization (TGO) website: Standard T-VER and Premium T-VER databases. • Annual corporate sustainability reports for the years 2023 and 2024 and stock exchange filings from major companies in energy, waste management, and agribusiness sectors. • Information on green bonds from the Thai Bond Market Association (ThaiBMA) website's database. • Annual report of Foreign Direct Investment (FDI) into Thailand that received Board of Investment (BOI) privileges, published by the BOI.	Project level
Financial Institutions • Commercial banks • State-owned banks • National development financial institutions	Data collected from corporate websites, latest sustainability reports, and available climate reports of all commercial banks registered in Thailand, state-owned banks, national development financial institutions	Corporate level
Impact Investors	Information from Revenue Department's registry of tax-deductible charitable organizations and UNFCCC Climate Finance Data Portal	Project level

Note: It is important to note that reporting climate finance from various sources is based on classification and reporting practices of each institution. While we strive to maintain consistency in the information presented, we do not independently audit or verify how these institutions apply climate finance definitions.

3.2 Data Assumptions and Limitations

3.2.1 Data Assumptions

The Thailand Climate Finance Tracker 2025 compiled data on climate-related investment commitments, not actual disbursements, from various sources through an in-depth desktop research approach. A data cleaning process has been implemented to standardize the data and correct inconsistent entries.

Due to our attempt at adhering to CPI's data collection methodology, in general, the datasets of the Tracker include:

- Total primary financial transactions and investment costs refer to new funding flows specifically directed toward achieving climate-related objectives.
- Components of activities that directly contribute to mitigation or adaptation.
- Public framework, policy, and capacity development expenditures.

On the other hand, it excludes:

- Secondary market transactions that relate to the exchange of existing assets, such as the resale of ownership stakes.

- Mechanisms or public subsidies that are primarily designed to reimburse initial investment costs, such as those supporting private research and development of new technologies.
- Investments with a high risk of GHG emissions lock-in in the future.

However, in certain circumstances in which data is incomplete, assumptions guided by the predefined principles outlined in Chapter 1 of this document are utilized to address such limitations. The assumptions and rationale for data collection are described below. These assumptions will be regularly revised to reflect evolving market conditions to compile data at the most accurate and granular level possible.

3.2.1.1 Eligible climate mitigation and adaptation finance

Often, the climate objective of a project can be inferred from the nature of the activity itself. Eligible climate mitigation finance is directed to activities or projects that demonstrate or substantially contribute to GHG emissions reductions. For instance, investing in a solar farm is clearly linked to mitigation, as it replaces fossil fuel-based energy with a low-carbon alternative.

On the other hand, eligible climate adaptation finance is directed to activities or projects with climate rationale that alleviate the climate impact, prevent damage and loss from climate change and strengthen the capability to withstand climate-related risks. For example, a mangrove restoration project in areas affected by rising sea level serves an adaptation purpose by helping communities and ecosystems better withstand coastal erosion. Financial flows directed to projects that are carried out as part of regular operations are not included in the dataset.

In cases where project-level data is incomplete or the climate objective is not clearly stated, a keyword search is applied to the project's title and description. This search draws on curated lists of terms associated with either mitigation or adaptation. If a match is found, the relevant climate use is assigned. In addition, the Tracker follows the principle of 'lean toward conservativeness.' If data is incomplete and contains insufficient information without any matched keyword, it will be considered ineligible and excluded from the datasets.

3.2.1.2 Green bonds

Green bonds were identified through the data in the Thai Bond Market Association (ThaiBMA) database. The Tracker collects information only for bond issues that are explicitly labelled as "green." Sustainability-linked bonds were excluded from the dataset, since the use of proceeds for this type of bond is not explicitly linked to primary investments. In addition, the dataset does not include any proceeds figure that is clearly slated for general corporate purposes or to refinance existing debt.

To determine the types of projects financed and their relevant activities (e.g. renewable energy generation or energy efficiency), issuer documents, including green bond frameworks, prospectuses, impact reports, and fund allocation reports were reviewed. Bond prospectuses were further examined to assess how proceeds were allocated between new financing and refinancing; only new financing for activities that fit climate mitigation or climate adaptation is included. In cases where detailed project-level information was unavailable, sector classification relied on categories reported by the issuer and then matched with the Tracker's classification. For example, green bonds lacking specific disclosures but known to finance renewable energy projects were classified under the energy sector and marked as 'multiple solutions' for sub-sector where applicable.

3.2.1.3 Private finance projects by financial institutions

Private finance projects by financial institutions were identified by in-depth screening of annual and sustainability reports of Thai financial institutions, focusing on commercial banks, state-owned bank, and national development financial institutions.

The portfolios of commercial and state-owned Thai banks were reviewed for climate-aligned lending, including renewable energy loans, green real estate, and energy efficiency retrofits, and activities related to climate adaptation. Financing amounts were based on the banks' own disclosures, for example in the sustainable finance or Environment Social and Governance (ESG) sections.

Like the eligible green bond data mentioned above, the Tracker collects only investments that are explicitly labelled as "green". Therefore, sustainability-linked loans were excluded from the datasets.

3.2.1.4 Multilateral Development Financial Institutions

The classification of sectors and activities within climate finance—whether designated as mitigation or adaptation, is typically determined by multilateral development institutions reporting the data. For example, Multilateral Development Banks (MDBs) assess specific components of their projects to identify elements that qualify, either wholly or partially, as adaptation finance. Each MDB applies its own established methodology to allocate financial flows between mitigation and adaptation objectives, with safeguards in place to prevent the double counting of funds.

To avoid double counting, we exclude (1) external resources that DFIs manage on behalf of third parties; (2) governments' contributions to DFIs or Climate Funds; (3) bilateral Climate Funds' commitments; and (4) DFIs' contributions to projects reported in BNEF (2021a). In Thailand context, we cover existing commitments from the Green Climate Fund (GCF), Climate Investment Funds (CIF), Global Environment Facility (GEF), and Adaptation Fund.

3.2.1.5 Corporate Investments

Corporate investment data were obtained from capital expenditure (CAPEX) plans or dedicated ESG and/or Sustainable Development Goals (SDG) investment sections in annual reports and sustainability reports, as well as corporate websites. The Tracker emphasizes major listed companies in Thailand whose reports are publicly available. The datasets capture only include direct investments in climate-aligned assets, such as solar farms and electric vehicle (EV) manufacturing.

Apart from corporate sustainability reports and disclosures, investment flows were also tracked through carbon offset projects identified in the Thailand Greenhouse Gas Management Organization (TGO) carbon registry. Each project was classified by type, such as solar photovoltaic panels for electricity generation, power generation using biomass, and energy efficiency (EE) and assessed based on its credit issuance volume and project status.

In addition, the Tracker also utilized the Board of Investment's annual reports of foreign direct investment (FDI) to record FDI flows toward clear climate-related activities, such as investments in solar PV and electric vehicles (EVs) in Thailand.

3.2.1.6 Domestic Public Expenditure

Climate finance investments committed by government and their agencies were collected at project level in both central and local governments. For the federal government, the domestic public expenditure on climate finance was traced by reviewing annual appropriations and relevant national budget documents from the Budget Bureau. CFNT focused on relevant ministries that are responsible for climate-related functions due to the challenge that data from the government is dispersed across multiple ministries.

For local government level, committed climate finance flows were uncovered through provincial and municipal budget ordinances to identify financial allocations towards mitigation- and adaptation-relevant initiatives. Examples include investments in solar-powered infrastructure, electrified public transport systems, and municipal waste-to-energy projects.

While the federal government provides somewhat sufficient data to classify climate mitigation and adaptation commitments, local government lacks transparency and details provided in specific projects or activities. This makes it challenging to categorize the project by sector or even determine whether it has a climate-related purpose. The documents were reviewed to identify financial allocations towards climate-relevant initiatives across sectors[2].

To cope with challenges, we perform keyword searches with climate rationale and justification. We also look at multiple years of other projects to see the pattern of the name or nature of the project. Furthermore, where information of climate relevance is not available, or is found to diverge with CPI's classification and Tailwind Taxonomy, a keyword search is performed to filter for climate-related projects.

3.2.1.7 Domestic Public Funds

The data available from domestic public funds provides only a limited level of detail and climate objective. To close the gap on limited details available, CFNT put its best effort to use keyword search to map the projects to climate objectives. As a result, projects with unclear objectives and climate rational or lacking keywords will be excluded from the dataset.

Data from domestic funds for the Thailand Climate Finance Tracker 2025 were compiled from the Energy Conservation Promotion Fund and the Environment Fund at a project level, with a focus on financial flows directed toward mitigation outcomes. Examples are funding for rooftop solar installations and energy efficiency upgrades in the industrial process. The data was also presented in a single budget year.

3.2.1.8 Impact Investors

Climate investment flows from foundations and nonprofits were identified via the Revenue Department's registry of tax-deductible charitable organizations. Initial screening was based on names (e.g., suggesting environmental or sustainability missions). Relevant entities were further investigated via websites and public news sources to confirm climate-related funding activities.

3.2.1.9 Institutional investors and households

Based on the current data landscape, we deem the climate change investment data from institutional investors and households currently too scattered and nonpublic to include in the 2025 Tracker. Efforts will be made to continuously monitor and track its availability in the future.

3.2.2 Data Limitations

The data collection process for the Thailand Climate Finance Tracker faces several limitations on incomplete disclosures across institutions and gaps in publicly available data. The limitations include:

[2] Examples include investments in solar-powered infrastructure, electrified public transport systems, and municipal waste-to-energy projects.

3.2.2.1 Insufficient detail for sectoral breakdown

A challenge in sectoral breakdown arises from data provided by local government agencies, financial institutions, and corporate investment. For example, most commercial banks report aggregated green loans' amount without sectoral breakdowns. Therefore, to manage this challenge but still present useful information, those amounts are marked as 'undetermined' in the Tracker.

In the case of corporate investments, most companies publicly disclose only qualitative information, such as general statements about ongoing climate-related initiatives or projects, rather than quantitative data on financial commitments. As a result, we obtain more specific information from further investigation using alternative sources, such as the Thai Bond Market Association (ThaiBMA) database.

3.2.2.2 Insufficient detail to categorize financial instruments

Categorizing financial instruments associated with climate-related corporate investments presents a significant challenge due to limited disclosure. As companies rarely disclose the specific types of instruments used, differentiating between balance sheet financing and project-level debt financing by corporates remains challenging. In such cases, we initially assume that the investment is financed through the corporate balance sheet. However, if relevant records are identified in the ThaiBMA database, we classify the investment as project-level debt financing.

3.2.2.3 Unavailable data

Data for some sources of funds is not publicly available; for example, domestic public fund flows to support climate adaptation efforts and data on institutional investors and households. Any future updates or additional information will be incorporated into the tracker as they become available.

3.2.2.4 The need for future surveys

To address the challenges in insufficient public disclosure, the use of structured surveys or focus group discussions with key stakeholders is under consideration for future updates. These methods would help clarify project funding objectives, financial instruments, and allocations at the project level.

4. Mitigation and Adaptation Sector and Activities

This section provides a detailed description of the sectoral classification framework utilized to systematically categorize financial flows directed toward climate mitigation and adaptation efforts. The frameworks are intended to ensure consistency and transparency in tracking and reporting climate-related investments. The section also provides examples of various projects that would be considered under each category, helping to illustrate how those initiatives align with the goals of climate mitigation and adaptation.

As mentioned in Section 1.3 Key Reference Methodologies, the Thailand Climate Finance Tracker 2025 applies sector classifications and activity breakdown differently for mitigation and adaptation efforts. The goal is to create a comprehensive dataset that can be effectively mapped and updated. For climate mitigation, the Tracker uses the Climate Policy Initiative (CPI) sector classification framework, while for climate adaptation, it follows the sector classification described in Tailwind Taxonomy. Details of the classification will be provided in Section 4.1 Scope of Sectors and Activities.

As the Tracker aims to collect data on Thailand's climate finance commitments, we also compare our sector classification and project mapping with country's most recent (as of May 2025) Nationally Determined Contribution (NDC) Action Plan and National Adaptation Plan (NAP). This exercise is intended to ensure interoperability between internationally recognized sector classifications and activity breakdown systems and Thailand's national strategies. This approach helps enhance the relevance and usability of the data for further analysis, reporting, and decision-making. Details of the mapping can be found in Section 4.2 Mapping with Thailand's NDC Action Plan and NAP.

4.1 Scope of Sectors and Activities.

Each area of climate finance – mitigation and adaptation – is assessed using a distinct framework tailored to its specific goals and characteristics.

4.1.1 Climate Mitigation Finance - sectors and sub-sectors used in Thailand Climate Finance Tracker

For climate mitigation finance, the Climate Finance Tracker uses the classification developed by the Climate Policy Initiative (CPI) which builds on several economic activity classification systems, including: the MDB Joint Climate Finance Group methodologies (2021 and 2023), the Climate Bonds Initiative (CBI) taxonomy (2021), the IPCC Working Group III's Sixth Assessment Report (AR6) (2022), the EU Taxonomy (2020), and the OECD Creditor Reporting System (2021). In addition, CPI's classification emphasizes energy transition investments with a clear climate rationale, specifically those with clear mitigation benefits where they genuinely avoid or significantly reduce greenhouse gas emissions. This approach ensures that the finance captured includes only the investments that support emission reductions toward national targets and climate commitments. For example, commitments to energy generation by fossil fuels (coal, oil, natural gas) are excluded from the energy sector. For electrified transport, this approach excludes plug-in hybrid EVs as these partially run on fossil fuels.

The full CPI classification framework of climate mitigation, including definitions for sectors, sub-sectors, and examples of mitigation solutions, is provided in Table 1: Climate Mitigation Finance - sectors and sub-sectors used in Thailand Climate Finance Tracker.

Note that as mentioned earlier, 'undetermined' signifies any investments that claim to have climate action purposes, but for which we cannot ascertain specific sub-sector, or in some cases, sector (for example, many commercial banks' 'green loans' portfolio. This definition of 'undetermined' is excluded from Table 2.

Table 2: Climate Mitigation Finance - sectors and sub-sectors used in Thailand Climate Finance Tracker
(Climate Policy Initiative, 2023)

Sector	Subsector	Mitigation solution	Additional information / Examples
Energy Systems	Power and Heat Generation	Biofuel/Biomass-fired	
		Geothermal	
		Hydropower	
		Hydrogen fuel cell	Using green hydrogen only
		Off grids (renewable only)	
		Other Marine	E.g. wave and tidal
		Solar – Concentrated Solar Power (CSP)	
		Solar – Photovoltaic (PV)	
		Multiple energy sources	Unspecified renewable energy (RE) projects or projects with a combination of multiple energy sources
		Renewable Retrofit	
	Power and Heat Transmission and Distribution	District Heating	Fueled by renewable energy only
		Smart Grid	
		Mini Grids	
		Power Grid – New and/or retrofit	New power grid that enables the integration of renewable power Capacity / Retrofits that lead to clear energy efficiency gains
	Fuel Production	Biogas	
		Biofuel	
		Hydrogen from Renewables	
	Fuel transmission and Distribution	N/A	
	Policy and National Budget Support and Capacity building	N/A	
	Undetermined		Purported energy projects for climate mitigation for which the subsector cannot be determined

Sector	Subsector	Mitigation solution	Additional information / Examples
Waste	Solid Waste	Infrastructure and management (including recycling)	
	Policy and National Budget Support and Capacity building	N/A	
Water and Wastewater	Water Supply and Sanitation	Basic water access or efficient large infrastructure	
	Waste Water Treatment	Infrastructure and Management	
	Policy and National Budget Support and Capacity building	N/A	
Industry	Industrial, Extraction, and Manufacturing Processes	Non-Energy and Fugitive GHG reduction	
		Carbon Capture Use and Storage	Excluding energy sector – Incremental cost only
		Energy-Use improvements & Other GHG cuts	
		Substitution with Hydrogen from Renewables	Industrial processes using hydrogen shifting from fossil fuel-based Hydrogen to renewable energy-based hydrogen
	Industry Infrastructure & Warehouse	Energy Efficiency	
	Policy and National Budget Support and Capacity building	N/A	
Transport	Private Road Transport	Battery EVs	Exclude plug-in hybrid EVs (partially run on fossil fuels)
		EV Chargers	
	Rail and Public Transport	Modal Shift Policy Support	
		Energy Efficiency – Retrofit and Fleet Retrofit	
		New Bus, Light or Heavy Rail Fleet & Related Infrastructure[3]	Shifts from a higher-carbon transport mode. FF-powered rail engines are excluded.

[3] Fossil fuel powered rail engines are excluded.

Sector	Subsector	Mitigation solution	Additional information / Examples
	Waterway	Energy Efficiency – Fleet Retrofit	
		New Low-carbon Fleet & Related Infrastructure	
	Aviation	Energy Efficiency –Retrofit	
		Modal Shift Policy Support	
	Policy and National Budget Support and Capacity building	N/A	
	Transport-oriented Infrastructure and Urban Development	Infrastructure for non-motorized transports	
Agriculture, Forestry, Other Land Uses and Fisheries	Agriculture	Sustainable Crops, Agro-forestry, Livestock production	
		Supply chain management (commercialization, primary processing & storage)	
		Financial services for sustainable production, commercialization, storage and processing	
	Forestry	Afforestation, Reforestation, Forest Conservation, sustainable management of existing forest, including extraction of non-timber products	
		Supply chain management (commercialization, primary processing & storage)	
	Fisheries	Sustainable fish production	
		Supply chain management (commercialization, primary processing & storage)	
	Food and diet	Food waste and low-carbon diets	
	Policy and National Budget Support and Capacity building	N/A	
Buildings and Infrastructure	Building & Infrastructure Construction Work	Energy Efficiency - New Construction and Retrofit	

Sector	Subsector	Mitigation solution	Additional information / Examples
	HVAC & Water Heaters	Renewable Energy-based HVAC	
		Solar Thermal Water Heaters	
		Energy Efficient HVAC[4]	
	Appliances & Lighting	Efficient Lighting systems (including public lighting)	
	Policy and National Budget Support and Capacity building	N/A	
Information and Communications Technology	Data Centers	New highly energy efficient centers or energy efficient retrofits	
	Telecommunication Networks	New highly energy efficient networks or energy efficient retrofits	
	Policy and National Budget Support and Capacity building	N/A	
Undetermined (Others and Cross-sectoral)	Policy and National Budget Support and Capacity building	N/A	

[4] For example, efficient cooling, etc.

4.1.2 Climate Adaptation Finance - themes and sectors used in Thailand Climate Finance Tracker

For climate adaptation finance, the Thailand Climate Finance Tracker uses the classification and activity breakdown in the Tailwind Taxonomy, which is developed to be a common language across adaptation and resilience activities by ClimateWorks Foundation and peer-reviewed by a board group of investors and philanthropies (Tailwind, 2024).

According to Tailwind Taxonomy, adaptation efforts focus on activities and investments committed to advancing the process of human and natural systems adjusting to the actual or expected impacts or effects of climate change and building climate resilience which means a system to withstand climate-related shocks or stressors. With these objectives, Tailwind Taxonomy covers 8 themes and 35 sectors with definitions of what is included in each theme and sector, projected impacts of climate change in each sector, along with examples to illustrate investment and enabling interventions that activities. These sectors are also mapped to widely used financial economic and impact taxonomies, such as the United Nations Sustainable Development Goals.

This approach targets activities with a clear climate rationale, especially those that adapt to reduce the impact of climate change. The Tailwind Taxonomy for climate adaptation and resilience, including definitions for theme, sectors, and examples of adaptation solutions, is provided in Table 3: Climate Finance Taxonomy - Adaptation themes and sectors used in Thailand Climate Finance Tracker.

Table 3: Climate Adaptation Finance – themes and sectors used in Thailand Climate Finance Tracker *(Tailwind, 2024)*

Theme	Sector	Sector Definition	Examples of Adaptation solution
1. Ecosystems	1.1 Marine Ecosystems	Marine ecosystems are aquatic environments with high levels of dissolved salt. These include open ocean, deep-sea ocean, and coastal marine ecosystems, each of which has different physical and biological characteristics. **Examples of physical and natural assets:** Coral Reefs, Seagrasses, Mangroves, Kelp Forests, Open Ocean, Estuaries, Intertidal Zones, Marine Sediments, Benthic Habitats, Pelagic Ecosystems	**Intelligence:** • Smart Buoy Systems for Real-Time Environmental Data • Satellite Surveillance of Ocean Currents • AI/ML powered Storm Prediction Models **Products and services:** • Biorock-based Coral Reef Restoration • Efficient Desalination Technologies • Construction of Dikes and Seawalls **Enabling interventions**: • Collaboration with Indigenous and Local Communities for Ecosystem Management • Internationally Recognized Marine Conservation Areas • Advocacy for Policy Measures Addressing Ocean Acidification
	1.2 Terrestrial Ecosystems	Terrestrial ecosystems are land-based communities of organisms and the interactions of biotic and abiotic components in a given area. Examples of terrestrial ecosystems include the tundra, taigas, temperate deciduous forests, tropical rainforests, grasslands, and deserts. **Examples of physical and natural assets:** Forests, Grasslands, Deserts, Wetlands,	**Intelligence:** • Satellite-Enabled Data Collection on Atmospheric Conditions • Desertification Monitoring Systems • Networked Heat Sensors to Detect Wildfires **Products and services:** • Genetically Engineered Trees • Erosion Control Blankets

Theme	Sector	Sector Definition	Examples of Adaptation solution
		Mountains, Savannas, Tundra, Taiga, Deciduous Forests, Rainforests, Deserts	• Drones for Tree Planting and Reforestation **Enabling interventions**: • Public Education and Awareness Campaigns on Species Threatened by Climate Change • Education on Indigenous approaches to Restoration and Conservation • Protection of Public Lands and the Establishment of Conservation Land
	1.3 Freshwater Ecosystems	Freshwater ecosystems refer to aquatic environments characterized by low salt concentration. These ecosystems include various bodies of water such as rivers, lakes, ponds, streams, and wetlands. Examples of physical and natural assets: Rivers, Lakes, Ponds, Streams, Wetlands, Aquifers, Springs, Glaciers, Riparian Zones, Swamps	**Intelligence:** • Smart Sensors for Real-Time River Flow Analysis • Hydrological Modeling and Forecasting Systems • Flood Early Warning Systems **Products and services:** • Sediment and Nutrient Management Technologies • Riparian Zone Management • River Levee Protection and Fortification Solutions **Enabling interventions**: • Community-Led River Cleanup Campaigns • Public Awareness Campaigns on Watershed Protection • Support for Indigenous Water Stewardship Practices

Theme	Sector	Sector Definition	Examples of Adaptation solution
2. Food, Agriculture & Forestry	2.1 Crop Production	Crop production involves the cultivation, transformation, processing, and distribution of both food and non-food crops. Food crops are subsistence crops that are meant for human consumption. They include fruits, vegetables, grains, and tubers, like potatoes. Crops not grown for human food are plants cultivated for purposes other than direct consumption, often serving industrial, livestock feed, biofuel, or fiber production needs. **Examples of physical and natural assets:** Tractors, Harvesters, Irrigation Systems, Greenhouses, Processing Plants, Storage Facilities, Transportation Vehicles, Farm Machinery, Fertilizer and Pesticide Equipment, Packaging Facilities, Arable Land and Soil Quality, Genetic Diversity of Crops, Pollinators, Agroecosystems, Water Resources	**Intelligence:** • AI-Powered Predictive Models of Future Growing Condition • In-Ground Sensors to Measure Soil Moisture • Drone Assisted Planting and Sowing **Products and services:** • Self-Planting Seeds • Drought-Resistant Crops • Hydroponic and Aeroponic Farming Techniques **Enabling interventions**: • Farmer-to-Farmer Knowledge Sharing Networks • Indigenous and Local Agricultural Practice Integration • Advocacy for Climate-Resilient Agricultural Policies
	2.2 Animal Production	Animal production involves the rearing, slaughtering, transformation, processing, and distribution of animal products. Industries in the animal production subsector raise or fatten animals for the sale of animals or animal products. Animal production encompasses a range of activities involved in the breeding, rearing, and management of animals for various purposes. **Examples of physical and natural assets:** Livestock Barns and Feedlots, Processing Plants, Transportation Vehicles,	**Intelligence:** • Efficient Watering Systems for Livestock • Real-time Herd Health Monitoring Systems • Software Tools for Pasture Management • **Products and services:** • Medical Solutions for Herd Health and Immunity • Farm and Barn Fortification and Ventilation

Theme	Sector	Sector Definition	Examples of Adaptation solution
		Slaughterhouses, Cooling and Storage Facilities, Farm Machinery, Livestock and Genetic Diversity of Animal Breeds, Grazing Lands, Forage and Pasture Resources, Water Sources	• Breeding of Climate Resilient Livestock Species **Enabling interventions**: • Indigenous and Local Livestock Management Practice Integration • Sustainable Pastureland Management Initiatives • Agroforestry and Silvopasture Training Workshops
	2.3 Forestry and Logging	Forestry and logging involve the management of forests as well as the cultivation, transformation, processing, and distribution of wood-based products for human use. **Examples of physical and natural assets:** Rainforest and their Biodiversity, Deciduous Forests, Mangrove Forests, Logging Equipment, Sawmills, Trucks and Transportation Vehicles, Processing Machinery, Logging Camps, Storage Facilities	**Intelligence:** • Satellite Imaging of Forest Ecosystems • Wildfire Early Warning Systems • Sensors and Cameras for Local Intelligence **Products and services:** • Regenerative Forestry Technologies • Selective Breeding of High Seed-Bearing Trees • Drone-Based Planting Technologies **Enabling interventions**: • Community-Led Forest Management Workshops • Indigenous and Local Forest Management Practices Integration • Advocacy for Climate-Resilient Forest Management Policies
	2.4 Fishing and Aquaculture	Fishing and aquaculture involve the cultivation, transformation, processing, and distribution of seafood. Aquaculture involves cultivating	**Intelligence:** • Blockchain and other Supply Chain Transparency Solutions

Theme	Sector	Sector Definition	Examples of Adaptation solution
		freshwater, brackish water and saltwater populations under controlled or semi-natural conditions, and can be contrasted with commercial fishing, which is the harvesting of wild fish. **Examples of physical and natural assets:** Fishing Boats, Aquaculture Facilities, Processing Plants, Storage Facilities, Transportation Vessels, Hatcheries, Netting and Fishing Gear, Cold Storage Units, Fish Stocks, Aquatic Ecosystems, Water Quality, Seabed and Substrate, Coastal Habitats, Biodiversity, Kelp, Seaweed and Other Marine-Based Plants	• AI-based Markets Matching Buyers and Suppliers of Fish Climate Modeling Software for Aquaculture Farms **Products and services:** • Aquaponic Farms and Aquaculture • Development of Climate Resilient Fish and Kelp Species Underwater Robots and UAVs for Monitoring **Enabling interventions**: • Indigenous and Local Fishing Techniques Integration • Sustainable Fish Stock Monitoring and Management • Policy Development for Conservation of Marine Habitats
	2.5 Food Systems	The food and beverage Industry includes all the companies involved in transforming raw agricultural goods into consumer food products. The overall industry supply chain includes food processing, packaging, and distribution. This sector includes food systems at large (all aspects of food production and consumption) and food security. This sector focus on food security and food resilience. Examples of physical and natural assets: Processing Plants, Packaging Facilities, Refrigeration and Storage Units, Transportation Vehicles, Distribution Networks, Machinery and	**Intelligence:** • IoT Temperature Management Systems • Supply Chain Tracking Technologies • Temperature Sensors **Products and services:** • Energy Efficient Cold Storage Facilities • High Humidity Absorption Food Packaging Materials • Novel Protein Fermentation Process **Enabling interventions**: • Malnutrition reduction programs

Theme	Sector	Sector Definition	Examples of Adaptation solution
		Equipment, Research and Development Facilities, Commercial Kitchens, Retail Outlets	• Campaign to Reduce Food Deserts in Low-Income Areas • Pilot programs for alternate proteins or crops
3. Infrastructure	3.1 Electricity Systems	The interconnected infrastructure and networks are designed to generate, transmit, distribute, and deliver electrical power to end-users. These systems involve a combination of power generation facilities, transmission lines, substations, and distribution networks. This sector focuses on energy resilience to alleviate or prevent loss and damage from rising temperature, changes in temperature patterns and extreme weather events **Examples of physical and natural assets:** Power Plants, Transmission Lines, Substations, Transformers, Generators, Turbines, Renewable Energy Assets, Hydroelectric Dams, Geothermal Power Plants, Battery Storage Systems, Control Rooms, Metering Equipment, Distribution Lines	**Intelligence:** • Demand Optimized Smart Power Grids • AI-based Predictive Grid Hardening Tools • Sensors for Rapid Emergency Deactivation • Early Warning Systems for Wildfires **Products and services:** • Efficient Boring and Undergrounding Technologies • Modular Energy Storage Technologies • Novel Materials for Grid Hardening Solutions **Enabling interventions**: • Policy Advocacy for Renewable Energy Regulations with Resilience • Community Education on Microgrids and Distributed Energy Resources • Support for Community Resilience Hubs
	3.2 Ground Transportation	Ground transportation systems consist of roads, bridges, pipeline systems, rail, mass transit, and postal/shipping services. The projects in this sector aim to increase the resilience of infrastructure and human settlements to climate	**Intelligence:** • Predictive Geospatial Tools to Reroute Traffic Congestion • Heat Sensors for Roads and Railways

Theme	Sector	Sector Definition	Examples of Adaptation solution
		change impacts to ensure basic and continuous essential services for all and minimizing climate-related impacts on infrastructure and human settlements. **Examples of physical and natural assets:** Roads, Bridges, Tunnels, Vehicles (e.g., Cars, Trucks, Buses), Traffic Signals and Signs, Overpasses and Underpasses, Toll Booths, Rest Areas and Service Stations, Railroads, Railway Stations, Taxi Depots	• Intelligent Railroad Sensors for Real-Time Traffic Management • Advanced Weather Forecasting **Products and services:** • Heat Resistant Materials for Railways • High Albedo Pavements • Flood Defense Technologies for Tunnels **Enabling interventions**: • Awareness Campaign on Extreme Heat in Public Transportation • Local Climate Impact Assessments for Transportation Systems • Participatory Mapping of Bus Routes
	3.3 Maritime Transportation	Maritime transportation systems consist of waterways, oceans, rivers, lakes, ports, and intermodal landside connections. The projects in this sector aim to increase the resilience of infrastructure and human settlements to climate change impacts to ensure basic and continuous essential services for all and minimizing climate-related impacts on infrastructure and human settlements. **Examples of physical and natural assets:** Ships and Vessels, Ports, Harbors, Docks, Piers, Wharves, Container, Terminals, Bulk Terminals, Passenger Terminals, Marinas, Breakwaters, Navigation Channels, Coastal Infrastructure	**Intelligence:** • Early Storm and Hurricane Warning Systems • Sensors for Real Time River Flow Analysis • Satellite-Based Sea Level Monitoring Services **Products and services:** • Thermal Insulation Technologies for Shipping Containers • Dredging and Sediment Management Solutions • Floating Berths • Hydraulic Sea Walls **Enabling interventions**:

Theme	Sector	Sector Definition	Examples of Adaptation solution
			• Updated Industry Standards for Ports Resilience • Participatory Planning for Coastal Construction and Zoning
	3.4 Air Transportation	Air transportation systems consist of airports, heliports, landing strips, air traffic control systems, aircraft (manned and unmanned), and support services. The projects in this sector aim to increase the resilience of infrastructure and human settlements to climate change impacts to ensure basic and continuous essential services for all and minimizing climate-related impacts on infrastructure and human settlements. Examples of physical and natural assets: Airports, Runways, Taxiways, Terminal Buildings, Air Traffic Control Towers, Aircraft Hangar, Radar Systems, Aircraft, Ground Support Equipment (e.g., Baggage Carts, Fuel trucks), Cargo Handling Facilities, Aircraft Maintenance Facilities, Weather Monitoring Equipment, Helicopters	**Intelligence:** • Advanced Weather Monitoring and Communication Tools • Coastal Runway Erosion Prediction Tools **Products and services:** • Flood Defenses for Coastal Airports • Heat Resistant Aircraft Components • Protective Heat Shields for Aircrafts • Aircraft De-icing Technologies **Enabling interventions**: • Conservation Projects for Airports and Surrounding Lands • Participatory Planning for Airport Facilities Resilience
	3.5 ICT Infrastructure	The comprehensive system of networks, equipment, and facilities that enable the transmission and reception of information through electronic means over long distances. It encompasses telecommunications networks, fiber optic cables, satellites, radio frequency spectrum, switching systems, cell phone towers, and associated hardware and software. The projects in this sector aim to increase the	**Intelligence:** • AI Early Warning Systems • Emergency Mass Notification Systems • High Resolution Satellite Imaging **Products and services:** • Extreme Weather-Resistant Communication Towers

Theme	Sector	Sector Definition	Examples of Adaptation solution
		resilience of infrastructure and human settlements to climate change impacts. **Examples of physical and natural assets:** Data Centers, Servers, Networking Equipment (Routers, Switches), Fiber Optic Cables, Communication Towers, Satellite Dishes, Telecommunication Cables (e.g., Submarine Cables), Antennas, Network Operation Centers (NOCs), Power Backup Systems (Generators, UPS), Mobile Sase Stations, Data Storage Devices (Hard Drives, Solid-State Drives), Satellites	• Energy Efficient Cooling Systems for Data Centers • Emergency Backup Power Systems **Enabling interventions**: • Protection Campaign for ICT Workers • Local Climate-Resilient ICT Planning and Coordination
4. Water & Sanitization	4.1 Water Infrastructure	Water systems, including water treatment and distribution systems. Management of the availability, quality, and distribution of water resources through infrastructure and natural systems. **Examples of physical and natural assets:** Water treatment Plants, Pumping Stations, Reservoirs, Distribution Networks, Storage Tanks, Desalination Plants, Dams, Pipelines, Wastewater Treatment Facilities, Hydropower Plants, Rivers, Lakes and Aquifers, Watersheds, Groundwater	**Intelligence:** • Smart Water Metering Systems • AI-powered Pump Stations and Substations • Remote Sensing and Satellite Technology for Water Management **Products and services:** • Air Water Capture technology • Desalination Technology • Water Recycling and Reuse Systems **Enabling interventions**: • Rainwater Harvesting Programs • Educational Programs on Water Efficiency • Advocacy for Inclusive Water Policies at Local and National Levels
	4.2 Sanitation Infrastructure	Physical and natural assets and services related to the promotion of hygiene and prevention of	**Intelligence:**

Theme	Sector	Sector Definition	Examples of Adaptation solution
		disease through the maintenance of sanitary conditions including infrastructure and systems related to sewage and trash management, stormwater management, and drainage. The projects in this sector aim to increase the resilience of infrastructure and human settlements to climate change impacts. **Examples of physical and natural assets:** Treatment Plants, Collection Systems, Pumping Stations, Storage Facilities, Landfills, Recycling Facilities, Composting Facilities, Transfer Stations, Waste-to-Energy Plants, Distribution Networks, Natural Filtration Systems	• IoT Sewage System for Water Flow Management • Regulatory Reporting and Compliance Software • Early Warning Systems for Sanitation Facilities **Products and services:** • Drainage Swells • Emergency Storage Tanks and Containers • Shade Balls for Dam Evaporation Prevention • Distributed Water Treatment Systems **Enabling interventions**: • Awareness Campaigns for Stormwater Drain Maintenance • Training Programs for Waste Management Personnel • Local and Regional Waste Management Planning and Coordination
5. Health	5.1 Healthcare Services and Medical Facilities	Healthcare is the improvement of health via the prevention, diagnosis, treatment, amelioration or cure of disease (communicable and noncommunicable), illness, injury, and other physical and mental impairments in people. This sector includes hospitals and outpatient facilities, healthcare services, as well as manufacturers and providers of health care equipment and supplies. Projects in this sector aim to attain resilience against climate change	**Intelligence:** • Early Warning Systems for Vector-Based Diseases • Heat Sensors for Internal Body Temperature • Disease Prediction and Surveillance Technologies **Products and services:** • Mobile Medical Equipment and Units

Theme	Sector	Sector Definition	Examples of Adaptation solution
		related health impacts, promoting climate-resilient health services, and significantly reducing climate-related morbidity and mortality, particularly in the most vulnerable communities. **Examples of physical and natural assets:** Hospital Buildings, Medical Equipment, Laboratory Facilities, Outpatient Facilities, Retirement Homes, Ambulances, Blood Banks, Medical Supplies and Consumables	• Wearable Cooling Devices • Rapid Diagnostic Tests • Efficient A/C for Hospitals **Enabling interventions**: • Updates to Hospital Building Regulations • Advocacy for Affordable Medications and Treatment • Community-Based Disease Education and Outreach
	5.2 Pharmaceuticals and Biotechnologies	Pharmaceuticals include organizations that develop and produce pharmaceuticals, perform biotech research and product creation, and offer life sciences tools and services. Adaptation goal is to attain resilience against climate change related health impacts, promoting climate-resilient health services, and significantly reducing climate-related morbidity and mortality, particularly in the most vulnerable communities. **Examples of physical and natural assets:** Research Laboratories, Manufacturing Facilities, Bioreactors, Fermentation Tanks, Cleanrooms, Freeze Dryers, Chromatography Systems, Cold Storage Facilities, Cryogenic Storage Tanks, Automated Liquid Handling Systems, Bioprocessing Equipment, Greenhouses, Pharmacies	**Intelligence:** • AI Driven Drug and Vaccine Discovery • Real-time Supply Chain Tracking and Management Software • Remote Cardiac Monitoring **Products and services:** • Genetic and Molecular Screening of Pathogens • Vector-Borne Disease Vaccines and Treatments • Cooling Solutions for Drug Transport and Storage • Mosquito Net and Other Control Technologies **Enabling interventions**: • Training Programs for Healthcare Professionals on New Pharmaceuticals • Vaccination Campaigns against Vector Diseases

Theme	Sector	Sector Definition	Examples of Adaptation solution
			• Advocacy for New Medication Access and Affordability
6. Cities & Settlements	6.1 Buildings	All residential, commercial, industrial, public and community buildings (including schools, libraries, museums, prisons, etc.). Housing includes individual homes, apartments, multi-family housing and other living spaces as well as informal dwelling. Adaptation goal of this sector is to increase the resilience of infrastructure and human settlements to climate change impacts. **Examples of physical and natural assets:** Single-Family and Multi-Family Homes, Mobile Homes, Office Buildings, Retail Stores, Restaurants, Factories, Warehouses, Data Centers, Schools, Libraries, Museums, Community Centers, Recreation Centers	**Intelligence:** • Satellite Imagery to Identify Damaged Buildings • AI-powered Flood Risk Assessment • Climate Risk Prediction Tools **Products and services:** • Fire Resilient Building Materials • Low-cost Modular Housing Solutions • High Albedo Building Materials • Green Roof and Cool Roof for Thermal Regulation **Enabling interventions**: • Building Codes Updates to Include Resilience Requirements • Community-Based Emergency Shelter Planning • Contractor Education on Applicable Resilient Building Solutions
	6.2 Urban and Community Planning	The development, planning and management of land use, resources and infrastructure within urban areas, including streets, roads and other public spaces, waterfronts, shores, parks, green spaces and recreational facilities. This includes both government-led and community-led planning processes. Adaptation goal of this sector is to increase the resilience of infrastructure and human settlements to climate change impacts.	**Intelligence:** • Flood Sensors • Optimized Routing Systems for Public Transport • Distributed Weather Monitoring Tools **Products and services:** • Permeable Road Surfaces • Removable Flood Defenses • Shade Structures • Cool Pavement

Theme	Sector	Sector Definition	Examples of Adaptation solution
		Examples of physical and natural assets: Streets and Roads, Public Space, Waterfronts, Parks, Green Spaces, Utilities (Water, Sewer, Electricity, Gas), Transportation Systems (Buses, Trains, Subways), Sidewalks, Streetlights, Public Restrooms, Playgrounds	• Misting and Other Cooling Outdoor Technologies **Enabling interventions**: • Urban Heat Island Education and Resource Sharing • Integration of Climate Resilience in Master Plans • Public Participation in Recreational Area Planning
7. Social Systems	7.1 Employment and Livelihoods	Economic activities that enable and support the financial health and prosperity of individuals, households, or communities, including income stability, employment opportunities, access to essential resources, and financial security. Adaptation goal is to substantially reduce the adverse effects of climate change on poverty eradication and livelihoods, in particular by promoting the use of adaptive social protection measures for all. **Examples of physical and natural assets:** Factories and Manufacturing Facilities, Buildings and Construction Sites, Retail Stores, Agricultural Land, Fisheries and Aquaculture Sites, Mining Sites, Renewable Energy Installations (Solar Farms, Wind Turbines), Transportation Infrastructure (Roads, Ports), Warehouses and Distribution Centers, Technology Hubs and Innovation Centers, Public Markets and Trading Centers, Tourism Destinations (Hotels, Resorts), Farms and	**Intelligence:** • Workforce Management Systems • Video and Teleconferencing Systems for Remote Work • Early Warning Systems for Weather Related Hazards **Products and services:** • Climate Resilient Personal Protective Equipment • Onsite Food and Beverage Services • Alternative Communication Equipment **Enabling interventions**: • Advocacy for Labor Standards and Protections • Development of Social Safety Nets for Unemployment • Climate Corps and Institutionalization of Climate Resilience-Related Jobs • Unemployment benefit and tax credit

Theme	Sector	Sector Definition	Examples of Adaptation solution
		Forests Community-Owned Enterprises and Cooperatives	
	7.2 Social Justice and Equity	The concept of fair and equitable distribution of opportunities, resources, and privileges within a society. Social justice aims to address and rectify systemic inequalities, discrimination, and injustices that may exist in various aspects of society. This includes activities focused on gender equality, indigenous rights, religious freedom, and others. Adaptation goal is to substantially reduce the adverse effects of climate change on poverty eradication and livelihoods, in particular by promoting the use of adaptive social protection measures for all. **Examples of physical and natural assets:** Places of Worship, Community Centers, Legal Aid Clinics, Advocacy Organizations, Public Spaces, Affordable Housing, Community Gardens, Parks and Recreational Facilities, Libraries, Educational institutions, Healthcare Clinics and Hospitals, Food Banks, and Distribution Centers, Publicly Owned Renewable Energy Assets	**Intelligence:** • Digital Inclusion Tools for Climate Vulnerable Populations • Community Engagement Platforms • Communication Tools for Marginalized Populations **Products and services:** • Construction of Shared Community Spaces • Community Resilience Hubs • Distribution of Personal Protective Equipment **Enabling interventions**: • Advocacy for the Integration of Equity Considerations in Adaptation Plans • Research on Differentiated Impacts of Climate on Gender and Minority Populations • Capacity Building on Climate Risk and Resilience in Social Services
	7.3 Human Migrations and Resettlements	The movement of populations or individuals from one geographic area to another in response to the impacts of climate change or potential impacts of climate change. Climate migrations can take various forms, including internal migrations within a country, cross-border migrations, or displacements within and across regions or cities. The adaptation goal is to substantially reduce the adverse effects of	**Intelligence:** • Biometric Identification Systems, • Social Media Based Information Dissemination, ML/AI Migration Prediction Tools **Products and services:** • Portable Water Filters, • Mobile Sanitation Systems

Theme	Sector	Sector Definition	Examples of Adaptation solution
		climate change on poverty eradication and livelihoods, in particular by promoting the use of adaptive social protection measures for all. **Examples of physical and natural assets:** Transportation Infrastructure (Roads, Railways, Airports), Refugee Camps, Migrant Shelters, Resettlement Housing, Border Crossings, Migration Detention Centers, Reception and Welcome Centers, Transit Hubs, Natural Barriers (Mountains, Rivers) Affecting Migration Routes, Coastal Areas for Maritime Migration, Migration Corridors, Humanitarian Aid Supplies, Temporary Housing Facilities, Healthcare Facilities and Services, Consulates and Embassies	• Mobile Medical Units and Facilities **Enabling interventions**: • Community Resettlement Planning Programs • Job Training and Language Education Programs for Migrants • Legal, Health, and other Immigrant Aid Programs • Buyout programs for unrecoverable land / assets
	7.4 Peace and Security	Activities related to peace and security, including diplomacy, conflict prevention, peacekeeping, national security, and human rights protection as they may be affected or threatened by climate impacts. The adaptation goal is to substantially reduce the adverse effects of climate change on poverty eradication and livelihoods, in particular by promoting the use of adaptive social protection measures for all. **Examples of physical and natural assets:** Peacekeeping Mission Personnel and Physical Assets, Military Bases, Border Barriers and Checkpoints, Intelligence Gathering Infrastructure, Emergency Response Vehicles, Command and Control Centers, Natural Barriers (Mountains, Rivers) for Defense, Coastal Defense Systems (Naval bases, Coastal fortifications),	**Intelligence:** • Advanced Climate Monitoring and Intelligence Technologies • Social Media Monitoring Platforms • Satellite Monitoring of Military Deployments **Products and services:** • Building Resilience for Military Base and Installations • Microgrids and Distributed Energy Resources for Military Deployments • Emergency Medical and Relief Supplies **Enabling interventions**: • Community Conflict Resolution Programs

Theme	Sector	Sector Definition	Examples of Adaptation solution
		Cybersecurity infrastructure, Public Alert Systems Surveillance Equipment (Cameras, Drones), Barracks and Detention Centers, Training Facilities	• Peace Building Programs in Regions Vulnerable to Climate Impacts • Training of Military Leadership on Extreme Heat
	7.5 Government Operations	The activities, processes, and functions undertaken by a government to fulfill its responsibilities and provide services to its citizens at the local, regional and national level. The adaptation goal is to substantially reduce the adverse effects of climate change on poverty eradication and livelihoods, in particular by promoting the use of adaptive social protection measures for all. **Examples of physical and natural assets:** Government Buildings, Administrative Offices, Courthouses, Legislative Chambers, Law Enforcement Facilities, Government Vehicles, Public Utilities (Water, Electricity, Gas), Roads and Bridges , Land Parcels Owned or Managed by the Government, Public Hospitals and Healthcare Facilities, Emergency Response Infrastructure (Fire Stations, Ambulance Depots), Government-Owned Landfills and Waste Management Facilities, Communication Networks (Radio Towers, Satellite Systems)	**Intelligence:** • Digital Platforms for Community Engagement • Adaptation and Planning Mapping Software • Sensors for the Monitoring of Critical Infrastructure and Assets **Products and services:** • Climate-Adaptive Transportation Infrastructure • Mobile Command Centers • Backup Power Systems and Energy Storage **Enabling interventions**: • Employee Training and Capacity Building Initiatives • Community Engagement in Government Decision-Making • Adaptation Planning
	7.6 Disaster Risk Reduction (DRR)	Systematic efforts to minimize the vulnerabilities and enhance the resilience of communities and individuals to climate and weather-related disasters. DRR includes disaster identification, assessment, risk reduction, disaster preparedness, recovery, rehabilitation and reconstruction activities. This	**Intelligence:** • Networked Devices for Real Time Climate Emergency Alerts • Early Warning Systems

Theme	Sector	Sector Definition	Examples of Adaptation solution
		includes humanitarian aid following weather-related natural disasters. **Examples of physical and natural assets:** Government Buildings, Community Centers, Early Warning Systems, Emergency Shelters, Evacuation Routes, Disaster Response Vehicles, Emergency Medical Supplies, Communication Systems, Emergency Generators, Hazard Maps, Dams and Levees, Coastal Defenses, Forests, Vegetation, and other, Natural Barriers, Weather, Monitoring Stations, Emergency Water Storage Facilities	• Geospatial Imagery and Drone Technologies for Post-Disaster Assessment • Weather/Climate Risk Analytics Platforms **Products and services:** • 3D Printed Housing for Post-Disaster Recovery • Search and Rescue Equipment • Advanced Fire Suppression Systems **Enabling interventions**: • Knowledge Sharing and Capacity Building Programs • Policy Advocacy for Social Protection Programs and Resources • Participatory Community Risk Mapping Exercises
	7.7 Education, Knowledge and Information	Organizations such as educational institutions, research centers, public authorities, and media organizations and the activities they undertake related to public education on matters of science, health, and societal importance. This includes cross-sector capacity building initiatives, funding for scientific research and convenings, the dissemination of science and knowledge through publications, education, and training programs. **Examples of physical and natural assets:** Schools, Libraries, Universities, Classrooms, Laboratories, Books, Computers, Internet	**Intelligence:** • Climate Science Modeling and Research • Digital Education Platforms • Disaster Resilient Communication Platforms **Products and services:** • Resilience Products and Services for Organizations' Operations **Enabling interventions**:

Theme	Sector	Sector Definition	Examples of Adaptation solution
		Connectivity, Research Facilities, Archives, Educational Software, Radio	• Development of Tools, Framework and Taxonomies to Support Adaptation Finance • Climate Science and Research into Effectiveness of Adaptation Measures • Convenings and Publications
	7.8 Cultural Heritage	Cultural heritage includes tangible culture (such as buildings, monuments, landscapes, archive materials, books, works of art, and artifacts), intangible culture (such as folklore, traditions, language, and knowledge), and natural heritage (including culturally significant landscapes, and biodiversity). The adaptation goal is to protect cultural heritage from the impacts of climate-related risks by developing adaptive strategies for preserving cultural practices and heritage sites and by designing climate-resilient infrastructure, guided by traditional knowledge, Indigenous Peoples' knowledge and local knowledge systems. **Examples of physical and natural assets:** Historic Buildings and Monuments, Archaeological Sites, Museums, Artifacts, Cultural Landscapes, Traditional Crafts and Artworks, Historic Districts, Sacred Sites, Cultural Routes and Trails, Oral Traditions and Folklore, Traditional Costumes and Attire, Ritual and Ceremonial Objects, Historic Documents and Manuscripts, Religious Structures (Churches, Temples, Mosques, etc.), Traditional	**Intelligence:** • 3D Scanning and Modelling Techniques • Adaptive Visitor Flow Management Systems • Remote Sensing and Monitoring Technologies **Products and services:** • Flood Barriers and Levees • Protective Enclosures and Storage Facilities • Landscape Modification for Erosion Control **Enabling interventions**: • Advocacy for Laws that Protect Cultural Heritage • Public Awareness and Education Campaigns • Research into the Climate Impacts of Cultural Heritage Sites

Theme	Sector	Sector Definition	Examples of Adaptation solution
		Music Instruments, Cultural Festivals and Events, Natural Resources	
	7.9 Financial Inclusion	The availability and accessibility of financial services, such as banking, savings, loans, and insurance, to all segments of the population, particularly those who are traditionally excluded or underserved. The adaptation goal is to substantially reduce the adverse effects of climate change on poverty eradication and livelihoods, in particular by promoting the use of adaptive social protection measures for all. **Examples of physical and natural assets:** Bank Branches, ATMs, Digital Payment Infrastructure, Payment Terminals, Point-of-Sale (POS) Devices, Community Centers, Microfinance Institutions, Payment Cards (Debit/Credit Cards), Biometric Identification Systems, Physical Cash	**Intelligence:** • Mobile Wallets and International Electronic Money Services • Tech Platforms for Financial Literacy and Education • Microfinance Software and Tools for Businesses and Households **Products and services:** • Contactless Payment and Point of Sale Devices • Rechargeable • Cordless Mobile Devices • Autonomous • Solar-Powered ATMs **Enabling interventions**: • Financial Literacy Education and Awareness Programs • Community Based Support and Sharing Programs (Mutual Aid, etc.) • Advocacy for Financial Literacy Education and Awareness Programs
8. Industry & Commerce	8.1 Mining	The extraction, processing, and utilization of minerals and other geological materials from the Earth. The sector includes a diverse range of operations, from large-scale open-pit mines to smaller underground operations, and covers a broad spectrum of commodities essential for various industrial processes and consumer goods. The adaptation goal is to ensure that	**Intelligence:** • Dust and Air Quality Monitoring Systems • Automated Mining Technologies • Drone-Based Mine Exploration **Products and services:** • Lab Developed Precious Metals

Theme	Sector	Sector Definition	Examples of Adaptation solution
		industrial and commercial operations are resilient to the projected and future impacts of climate change so that their economic output, operational safety, affordability of products and services and the provision of employment are not adversely affected by such impacts. **Examples of physical and natural assets:** Mines, Quarries, Shafts, Tunnels, Excavators, Trucks and Rigs, Blasting Equipment, Crushers, Conveyors, Processing Plants, Ore Stockpiles, Water Supply Infrastructure, Power Supply Infrastructure, Drainage Treatment Facilities	• Lightweight Mobile Mining Equipment • Water Minimal Mining Techniques **Enabling interventions**: • Labor Rights Advocacy • Training and Capacity Building for Unions • Coordination with Local Health Authorities and Emergency Managers
	8.2 Construction	Activities related to planning, design, execution, and maintenance of structures and infrastructure projects. It includes residential, commercial, industrial, and civil construction, covering everything from buildings and roads to bridges and utilities. The adaptation goal is to ensure that industrial and commercial operations are resilient to the projected and future impacts of climate change so that their economic output, operational safety, affordability of products and services and the provision of employment are not adversely affected by such impacts. **Examples of physical and natural assets:** Construction Sites, Buildings, Roads, Bridges, Tunnels, Dams, Highways, Railways, Airports, Seaports, Excavators, Bulldozers, Cranes, Trucks and Mixers , Concrete, Building Materials	**Intelligence:** • Air Quality Sensors • Advanced Construction Modeling Software • Helmets with Health Sensors for Workers Protection **Products and services:** • Industrialized Prefabricated Construction • Wearable Cooling Devices • Shade Structures **Enabling interventions**: • Improved Regulations for Workers Safety and Health • Training and Capacity Building for Unions and Employers • Studies on Extreme Heat and Health

Theme	Sector	Sector Definition	Examples of Adaptation solution
	8.3 Manufacturing	The process of converting raw materials, components, or parts into finished goods that meet a customer's expectations or specifications. Manufacturing encompasses a wide range of industries and sectors, from consumer products and electronics to machinery, vehicles, and industrial equipment. The adaptation goal is to ensure that industrial and commercial operations are resilient to the projected and future impacts of climate change so that their economic output, operational safety, affordability of products and services and the provision of employment are not adversely affected by such impacts. **Examples of physical and natural assets:** Factories, Production Lines, Machinery, Equipment, Assembly Stations, Conveyor Belts, Robots, Industrial Ovens and, Furnaces, Molds, Dyes, Industrial Presses, Welding, Cutting, and Packaging Machines, Raw Materials, Semi-Finished Goods. Finished Products, Waste Disposal Facilities	**Intelligence:** • AI-powered Supply Chain Risk Assessments • Drone Monitoring of Critical Resources for Manufacturing Operations • Generative Software Modeling Technologies for Manufacturing • Supply Chain Visibility Technologies (IoT, Blockchain) **Products and services:** • Passive and Active Cooling Systems • Emergency and Backup Power Resources • High Albedo Factory Roofing • Decentralized Manufacturing Technologies (3D Printing, Additive Manufacturing) • New resilient materials **Enabling interventions**: • Training Programs for Risk Managers and EHS Professionals • Research and Development for Adaptation and Resilience Products • Improved Regulation for Workforce Health and Safety for Extreme Heat
	8.4 Information Technology	IT encompasses a wide range of technologies and applications, including data centers, computer hardware, software development, networking, internet technologies, and data management. The adaptation goal is to ensure	**Intelligence:** • Energy Management Optimization Software • AI/ML Platforms for Climate Risk Management

Theme	Sector	Sector Definition	Examples of Adaptation solution
		that industrial and commercial operations are resilient to the projected and future impacts of climate change so that their economic output, operational safety, affordability of products and services and the provision of employment are not adversely affected by such impacts. **Examples of physical and natural assets:** Computers, Servers, Networking, Equipment (Routers, Switches), Data Centers, Storage Devices (Hard Drives, Solid-State Drives), Cloud Infrastructure, Mobile Devices (Smartphones, Tablets), Fiber Optic Cables, Satellite, Communication Systems, Power Backup Systems (Generators, UPS), Printers, Scanners, IT Support Facilities, Natural Cooling or Ventilation Systems for Data Centers , Cell Towers	• Predictive Analytics, Modeling and Sensors for Other Sectors • Mobile Applications for Emergency Communication **Products and services:** • Reinforced Resilient Cellular Towers • Uninterruptible Power Systems • High Efficiency Cooling Systems • Cloud Computing for Climate Models • Community Resilience App • Weather Data Analytics Platform **Enabling interventions**: • Advocacy for Distributed Energy Resources and Microgrids • Open-Source Access to Climate and Weather Data Models • Research and Development of Emergency Communication Systems and Tools
	8.5 Insurance	Insurance involves the transfer of risk from individuals, businesses, or other entities to insurance companies in exchange for premium payments. The industry offers a variety of insurance products, including life insurance, health insurance, property and casualty insurance, auto insurance, and other specialized coverages. The adaptation goal is to ensure that industrial and commercial operations are resilient to the projected and future impacts of climate change so that their economic output, operational safety, affordability of products and	**Intelligence:** • Advanced Risk and Catastrophe Modeling and Analytics • Geospatial Imagery via Drones • Remote Sensing and Satellite Imagery **Products and services:** • Resilience Products and Services for Underlying Assets • Resilience Products and Services for Insurers' Operations

Theme	Sector	Sector Definition	Examples of Adaptation solution
		services and the provision of employment are not adversely affected by such impacts. **Examples of physical and natural assets:** Policy Documents, Insurance Databases, Actuarial Tables, Insurance Company Offices, Call Centers, Claims Processing Centers, Insurance Policy Management Systems, Risk Mitigation Equipment and Technologies	**Enabling interventions**: • Economic Analysis of Cost of Climate Change • Research and Development of Climate Risk Modeling Tools • Education on Climate Risk Transfer Mechanisms
	8.6 Financial Services	Financial services include banking services, such as deposit-taking, loans, and payment services; investment services, including asset management, securities trading, and investment advisory; and other financial intermediation activities. The sector also involves services related to financial technology (FinTech), credit unions, mutual funds, pension funds, and various forms of financial advice. The adaptation goal is to ensure that industrial and commercial operations are resilient to the projected and future impacts of climate change so that their economic output, operational safety, affordability of products and services and the provision of employment are not adversely affected by such impacts. **Examples of physical and natural assets:** Bank Branches, ATMs (Automated Teller Machines), Online Banking Platforms, Mobile Banking Applications, Bank Vaults, Safe Deposit Boxes, Currency Notes and Coins, Payment Terminals, Trading Floors, Clearinghouses, Data Centers for Financial Transactions	**Intelligence:** • Climate Risk Analytics for Investment Portfolios • Remote Sensing and Satellite Imagery • Compliance and Governance Platforms for Risk Management **Products and services:** • Resilience Products and Services for Underlying Assets • Resilience Products and Services for Financial Institutions' Operations **Enabling interventions**: • Research on the Impacts of Climate Change on Default and Credit Risk • Mandatory Climate Risk Disclosures • Education and Training of Lending Institutions Staff and Leadership

Theme	Sector	Sector Definition	Examples of Adaptation solution
	8.7 Tourism	The tourism industry encompasses various activities related to travel, hospitality, and leisure, involving the movement of individuals or groups from one location to another for purposes of recreation, business, or other reasons. It includes a wide range of services and businesses, such as transportation (airlines, cruise lines, and car rentals), accommodations (hotels, resorts, and vacation rentals), food and beverage services (restaurants and cafes), tour operators, travel agencies, and attractions or entertainment parks. The adaptation goal is to ensure that industrial and commercial operations are resilient to the projected and future impacts of climate change so that their economic output, operational safety, affordability of products and services and the provision of employment are not adversely affected by such impacts. **Examples of physical and natural assets:** Tourist Attractions, Natural Landmarks (e.g., Waterfalls, Mountains), Historical Sites and Monuments, Beaches, National Parks, Wildlife Reserves, Theme Parks, Museums and Galleries, Zoos and Aquariums, Botanical Gardens, Tourist Accommodations (Hotels, Resorts, Lodges), Restaurants and Cafés Recreational Facilities (Golf Courses, Ski Resorts), Transportation Infrastructure (Airports, Roads, Railways), Shopping Districts and Markets	**Intelligence:** • AR/VR Tours and Experiences • Destination Management and Trip Planning Systems • Emergency Communication Systems **Products and services:** • Mobile Sanitation and Hygiene Stations • Shade Structures • Emergency Management Equipment and PPE **Enabling interventions**: • Development of Climate Resilient Tourism Policies and Guidelines • Citizen Science Programs on Environmental Protection • Capacity Building on Climate Resilience for Hotels and Restaurants

4.2 Mapping with Thailand's NDC Action Plan and National Adaptation Plan

Mapping the Climate Policy Initiative's (CPI) sectors with Thailand's NDC (Nationally Determined Contribution) Action Plan and mapping Tailwind Taxonomy with Thailand's National Adaptation Plan (NAP) helps see how climate finance flows tracked through the Tracker is aligned with Thailand's nationally defined priorities and targets under the Paris Agreement. This helps assess whether and how financial flows support the country's climate ambitions and may help inform policy decisions in the future.

4.2.1 Mapping climate mitigation activities between NDC Action Plan and CPI Criteria

Table 4: Activities under NDC Action Plan and Corresponding CPI Criteria

NDC Action Plan and Key Activities	Sector and Subsector (CPI Classification)
Energy	
• Electricity generation efficiency (incl. smart grids) • Renewable energy - energy and industry sectors • Energy efficiency a renewables - households • Energy efficiency & new building standards to conserve energy – buildings • Energy efficiency - industry • Biodiesel for vehicles • Pilot projects in capturing and storing CO2 at Arthit, the natural gas site	• Power & Heat Transmission & Distribution • Power & Heat Generation • Power & Heat Generation • Energy Efficiency - New Construction • Energy-Use improvements & Other GHG cuts • Biofuel • Carbon Capture Use and Storage (CCUS)
Waste	
• Burning landfill gas or using it for electricity generation • Waste to energy for electricity generation • Mechanic biological treatment • Community wastewater treatment	• Solid Waste • Solid Waste • Solid Waste • Wastewater Treatment
Industry	
• Replacing clinker with alternative materials • Improving refrigerant management	• Non-Energy and Fugitive GHG reduction • Energy-Use improvements & Other GHG cuts

NDC Action Plan and Key Activities	Sector and Subsector (CPI Classification)
Transport	
• Traffic management in the city • Promoting shared mobility and multi-modal transport • Improving the tax system to encourage the use of energy-efficient vehicles • Improving public transportation infrastructure • Promoting the use of electric locomotive • Promoting the use of electric boat • Promoting the use of hydrogen for transportation (after 2030) • Promoting Sustainable Aviation Fuel (SAF) at the airport • Promoting the adoption of EV • Development of rail transportation infrastructure • Improve efficiency in water transportation • Promoting logistic management	• Modal Shift Policy Support • Modal Shift Policy Support • Modal Shift Policy Support • Transport-oriented Infrastructure and Urban Development • New Bus, Light or Heavy Rail Fleet & Related Infrastructure • New Low-carbon Fleet & Related Infrastructure • New Low-carbon Fleet & Related Infrastructure • New Low-carbon Fleet & Related Infrastructure • Battery EVs • Transport-oriented Infrastructure and Urban Development • Energy Efficiency - Retrofit • Transport-oriented Infrastructure and Urban Development
Agriculture	
• Waste management measures in the livestock sector • Measures to reduce the use of chemical fertilizers • Measures for alternate wet and dry rice cultivation	• Sustainable Crops, Agro-forestry, Livestock production • Sustainable Crops, Agro-forestry, Livestock production • Sustainable Crops, Agro-forestry, Livestock production
In CPI but outside NDC Action Plan	
• Funding for basic water access (out of government budget) • Funding for ecosystem conservation • Excluded from this report due to the lack of data on “highly energy efficient data centers,” and most major potential investments are only at preliminary feasibility study or intention stage as of 31 December 2024 – e.g. the announcements by Amazon, Alphabet, and Microsoft of their intent to build data centers in Thailand.	• Basic Water Access • Biodiversity, Land & Marine Conservation • New highly energy efficient data centers or retrofits

4.2.1 Mapping climate adaptation activities between Thailand's National Adaptation Plan and Tailwind Taxonomy

Table 5: Activities under Thailand's NAP and Corresponding Tailwind Taxonomy Criteria

Thailand's National Adaptation Plan	Sector and Subsector (Tailwind Classification)
Natural resources management	**Ecosystems**
• Management of terrestrial ecosystems • Management of wetlands • Management of marine and coastal ecosystems	• Terrestrial Ecosystems • Freshwater Ecosystems • Marine Ecosystems
Agriculture and food security	**Food, Agriduture & Forestry**
• Management of crop farmland • Management of livestock farmland • Management of fisheries and aquaculture farmland • Supporting mechanisms for agriculture and food security	• Crop Production • Animal Production • Fishing and Aquaculture • Food Systems
Water Resources Management	**Water & Sanitization**
• Upstream management • Midstream and downstream management – Flood management • Midstream and downstream management – Drought management • Downstream water management • Supporting mechanisms for water resources management	• Water Infrastructure • Water Infrastructure • Water Infrastructure • Water Infrastructure • Water Infrastructure
Public Health	**Health**
• Preventing climate change health impacts • Supporting mechanisms for public health • Pharmaceuticals & Biotechnologies	• Healthcare Services & Medical Facilities • Healthcare Services & Medical Facilities • Pharmaceuticals & Biotechnologies
Human Settlements and Security	**Cities & Settlements**
• Management of metropolitan and large cities • Management of medium and small cities and communities • Supporting mechanisms for human settlements and security	• Urban & Community Planning • Urban & Community Planning • Buildings

Thailand's National Adaptation Plan	Sector and Subsector (Tailwind Classification)
• Disasters Risk Reduction (DRR) • Education, Information and Knowledge	• Disasters Risk Reduction (DRR) • Education, Information and Knowledge
Tourism	**Industry & Commerce**
• Management of natural tourism destinations • Management of art and culture tourism destinations • Supporting mechanisms for tourism	• Tourism • Tourism • Tourism
Included in Tailwind Taxonomy but outside NAP	
N/A	**Infrastructure** • Electricity Systems • Ground, Maritime, and Air Transportation • ICT Infrastructure
N/A	**Water & Sanitization** • Sanitization Infrastructure
N/A	**Health** • Pharmaceuticals & Biotechnologies
N/A	**Social Systems** • Employment and Livelihoods • Social Equity • Human Migrations & Resettlements • Government Operations • Peace and Security • Cultural Heritage
N/A	**Industry & Commerce** • Mining • Construction • Manufacturing • Information Technologies • Insurance • Financial Services

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