IDENTIFIED INVESTMENT NEEDED FOR CLIMATE-PROOF TRANSPORT INFRASTRUCTURE IN THAILAND

Bangkok railway station, unofficially known as Hua Lamphong station, is the central station in Bangkok, Thailand. It is in the center of the city in the Pathum Wan district, and is operated by the State Railway of Thailand. Photo: https://www.freepik.com/author/pkpm2540

https://www.undp.org/thailand

➜ Since Thailand is located in the tropical climate zone, the country is vulnerable to natural disasters including floods, storms, and drought. Climate change exacerbates natural hazards, particularly heavy rainfalls, and flash floods. While transportation has a great potential in reducing greenhouse gas emissions, the sector is also prone to climate change impacts

According to the assessment of Investment and Financial Flows (I&FF), Thailand needs 13-14 billion THB to make the transport infrastructure more resilient against climate change.

This assessment in Thailand is one of the activities under the NDC Support Project: Delivering Sustainability through Climate Finance Actions in Thailand.

Selection of the sector

According to Thailand's third Biennial Update Report (2020), transportation accounted for the largest consumption of energy at 39.41% in 2018. As Thailand's Nationally Determined Contribution (NDC) commits to a 20-25% emissions reduction compared to Business-as-Usual by 2030, the transport sector is one of the main contributors under Thailand's NDC Roadmap (2021-2030) with a planned reduction of 41 MtCO2eq in 2030 when compared to the Business-as-Usual level (Thailand's Mid-century, Long-term Low Greenhouse Gas Emission Development Strategy, 2021).

While transportation has a great potential to reduce greenhouse gas emissions, the sector is also prone to climate change impacts. However, the National Adaptation Plan includes measures only for some key sectors. So far, there has not been a structured study to define the adaptation scenario for roads and rails, the major modes of transportation in Thailand.

Institutional arrangements

The national I&FF team collaborated with the Office of Transport and Traffic Policy and Planning in the preparation of the I&FF assessment. The Department of Highways, the Department of Rural Roads, and the State Railway of Thailand also provided valuable support in ensuring access to the relevant information needed to realize the I&FF assessments.

The baseline and adaptation scenarios are determined following the UNDP guidelines, in consultation with the abovementioned agencies. The assumptions and assessment results were agreed upon and endorsed during national inter-ministerial dialogues in the context of the NDC.

INVESTMENT AND FINANCIAL FLOW ASSESSMENT

Objectives of the I&FF assessment

The overall objective of the I&FF assessment is to determine the extent and sources of funds needed to address climate change at the national level and builds directly on national government strategies, plans and programmes. In essence, the assessment seeks to answer the question: "From a development perspective, what can my country do to address climate change in selected key sectors, and what level of financial contributions will be needed to achieve these objectives?"

In this context, the I&FF teams examined the questions:

- What are the main adaptation / mitigation measures for the selected sectors in the next 25 years?
- Who is investing in the sector / Who are the main stakeholders and sources?
- What changes / increase in I&FF will be needed in the sectors?
- What additional I&FF are needed to address climate change?

The baseline and adaptation scenarios were developed to determine the flows of investments and finance needed to undertake priority measures from 2022-2030 (progressive adaptation case) and 2022-2050 (moderate adaption case. Timeframes were set according to the two milestones in the NDC of 2030 and 2050. Historical data was gathered and averaged to annual investment, and the average GDP growth of the year 2001-2020 (1.59%) was used to take into account the inflation. The assessment looks at the changes in investments needed for two groups: the government and corporations (private sector entities). Figure 1 shows the cooperation among governmental and private stakeholders to facilitate climate adaptation investment and the flow of the investment.

Rama IX Bridge is a bridge in Bangkok, Thailand over the Chao Phraya River. Photo: https://www.freepik.com/premium-photo/rama-ix-bridge thailand_3716400.htm#page=4&position=25&from_view=undefined #position=12

Road

Target roads under this study are those owned by the Department of Highways and the Department of Rural Roads and located near canals and rivers. Technically and economically viable adaptation measures for roads are drainage system improvements, ditch lining, installation of box culverts, laying the road higher, asphalt concrete resurfacing, and mechanically stabilized earth walls. Through consultation with major stakeholders, it was decided to focus the assessment ononly one-, two-, and three-digit national highways. Total investment for climate adaptation in road transportation is estimated at 13.1 billion THB. An assessment can be made on four-digit national highways, rural roads, and private roads in the following phase.

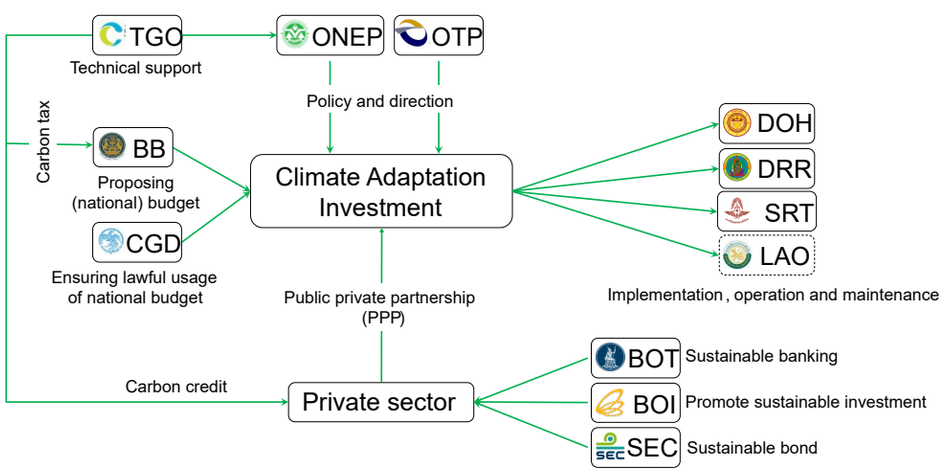

Figure 1 Stakeholders mapping

Rail

Rails considered under this assessment are those located close to a mountain or that run perpendicular to a waterway. Technically and economically viable adaptation measures for rails are the installation of box culverts, the construction of a steel or concrete bridge, sleeper replacement, and ballast refill. Based on the usage of the railways, the assessment was narrowed down to only Northern, North-eastern, and Southern lines. Total investment for climate adaptation in rail transportation is estimated at 0.4 billion THB.

CONCLUSION AND POLICY IMPLICATIONS

In total, approximately an additional 13–14 billion THB investment is needed to adapt transport infrastructure to climate change. The annual investment budget allocated for the Department of Highways, the Department of Rural Roads, and the State Railway of Thailand is much larger than what is needed for the proposed climate adaptation countermeasures. This assessment helps make the business case for action, as the summary tables of incremental investment show that the implementation of adaptation in the sector leads to savings in financial flows when implementing adaptation measures. Moreover, the additional investment can reduce the need for a national emergency budget.

There are several policy options to facilitate and accelerate government investment. A carbon tax is a mechanism to obtain the money for climate mitigation and adaptation projects and encourages the industry toward greener investment. It will increase the price of the fossil fuel and open the gate for the green technology to enter the market. The Excise Department has already launched an investigation on this concept. Public-private partnership, green, social and sustainability bonds, and green financing are the alternative measures for the government to promote the private investment in climate adaptation. The government can also seek funds and loans from foreign countries to implement the projects.

As a next step a pilot project to explore the practicalities of the proposed climate adaptation countermeasures is recommended. The national forum to increase awareness of stakeholders and foster collaboration in climate adaptation investment should be continued.

SUMMARY TABLES OF INCREMENTAL INVESTMENT COSTS

Table 1 Incremental investment and financial flows as well as operation and maintenance costs for all investments in each sector, by type of institution and source of investment. Period 2022-2030.

Year	General Budget [million THB]									Emergency Budget [million THB]		
	IF	FF	O&M	Climate adaptation for roads			Climate adaptation for rails					
				IF	FF	O&M	IF	FF	O&M	IF	FF	O&M
2022	0	0	0	1,327	0	66	45	0	2	0	0	0
2023	0	0	0	1,349	0	67	46	0	2	0	-19	0
2024	0	0	0	1,370	0	68	46	0	2	0	-39	0
2025	0	0	0	1,392	0	70	47	0	2	0	-60	0
2026	0	0	0	1,414	0	71	48	0	2	0	-81	0
2027	0	0	0	1,436	0	72	49	0	2	0	-103	0
2028	0	0	0	1,459	0	73	49	0	2	0	-126	0
2029	0	0	0	1,482	0	74	50	0	3	0	-150	0
2030	0	0	0	1,506	0	75	51	0	3	0	-174	0

IF = Investment Flows, FF = Financial Flows, O&M = Operation and Maintenance Costs
ΔI&FF = Incremental changes of Investment and Financial Flows, ΔO&M = Incremental changes of Operation and Maintenance Costs
Negative values mean net savings
Source: National I&FF assessment

Table 2 Incremental investment and financial flows as well as operation and maintenance costs for all investments in each sector, by type of institution and source of investment. Period 2022-2050.

Year	General Budget [million THB]									Emergency Budget [million THB]		
	IF	FF	O&M	Climate adaptation for roads			Climate adaptation for rails					
				IF	FF	O&M	IF	FF	O&M	IF	FF	O&M
2022	0	0	0	442	0	22	15	0	1	0	0	0
2023	0	0	0	450	0	22	15	0	1	0	-6	0
2024	0	0	0	457	0	23	15	0	1	0	-11	0
2025	0	0	0	464	0	23	16	0	1	0	-17	0
2026	0	0	0	471	0	24	16	0	1	0	-23	0
2027	0	0	0	479	0	24	16	0	1	0	-30	0
2028	0	0	0	486	0	24	16	0	1	0	-36	0
2029	0	0	0	494	0	25	17	0	1	0	-43	0
2030	0	0	0	502	0	25	17	0	1	0	-50	0
2031	0	0	0	510	0	25	17	0	1	0	-57	0
2032	0	0	0	518	0	26	18	0	1	0	-64	0
2033	0	0	0	526	0	26	18	0	1	0	-72	0
2034	0	0	0	535	0	27	18	0	1	0	-79	0
2035	0	0	0	543	0	27	18	0	1	0	-87	0
2036	0	0	0	552	0	28	19	0	1	0	-95	0
2037	0	0	0	561	0	28	19	0	1	0	-104	0
2038	0	0	0	570	0	28	19	0	1	0	-113	0
2039	0	0	0	579	0	29	20	0	1	0	-121	0
2040	0	0	0	588	0	29	20	0	1	0	-131	0
2041	0	0	0	597	0	30	20	0	1	0	-140	0
2042	0	0	0	607	0	30	21	0	1	0	-150	0
2043	0	0	0	616	0	31	21	0	1	0	-160	0
2044	0	0	0	626	0	31	21	0	1	0	-170	0
2045	0	0	0	636	0	32	22	0	1	0	-181	0
2046	0	0	0	646	0	32	22	0	1	0	-192	0
2047	0	0	0	656	0	33	22	0	1	0	-203	0
2048	0	0	0	667	0	33	23	0	1	0	-214	0
2049	0	0	0	677	0	34	23	0	1	0	-226	0
2050	0	0	0	688	0	34	23	0	1	0	-238	0

IF = Investment Flows, FF = Financial Flows, O&M = Operation and Maintenance Costs, ΔI&FF = Incremental changes of Investment and Financial Flows, ΔO&M = Incremental changes of Operation and Maintenance Costs
Negative values mean net savings
Source: National I&FF assessment

About NDC Support Project: Delivering Sustainability through Climate Finance Actions in Thailand (NDC Support Project)

The objective of the NDC Support Project is to support the Royal Thai Government to achieve transformational change by using NDC implementation as a mechanism to scale up investments in climate change and deliver socially-inclusive and gender-responsive climate actions for sustainable development, thereby helping the country deliver on the commitment outlined in its NDCs and, through this, on the Paris Agreement and the Sustainable Development Goals.

NDC Support Project is implemented in partnership with the Office of Natural Resources and Environmental Policy and Planning (ONEP), with generous supports from the Swedish International Development Cooperation Agency (Sida), the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMUB), and UNDP's Climate Promise.

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More information on I&FF:

https://www.ndcs.undp.org/content/ndc-support-programme/en/home/our-work/focal/ndc-finance-and-investment/investment-and-financial-flows--iff--assessments.html

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