

# Thailand

## Green Roads Profile

### General

Road length (2022)  
**702,989 kilometers**

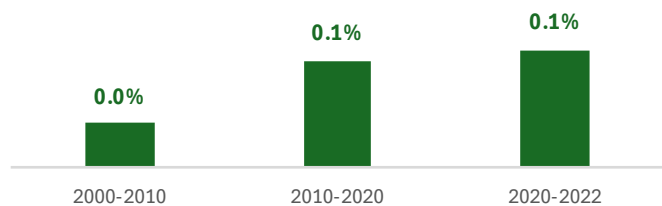
Subregion  
(1) **South East Asia**

Income class  
**Upper middle income**

Average annual growth rate of road length

Population (2024)  
(1) **71.9 million**

Land area  
**511 thousand sqkm** (2,3)



Urban population  
**54%**

Rural population  
**46%** (2)

Gross domestic product (GDP PPP, 2022)  
**1.48 trillion USD**

GDP per capita (PPP, 2022)  
**20,679 USD** (2,3)  
(3)

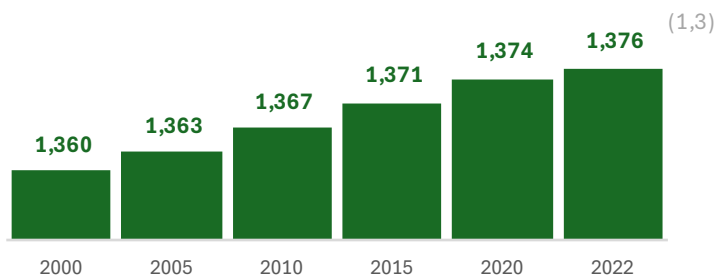
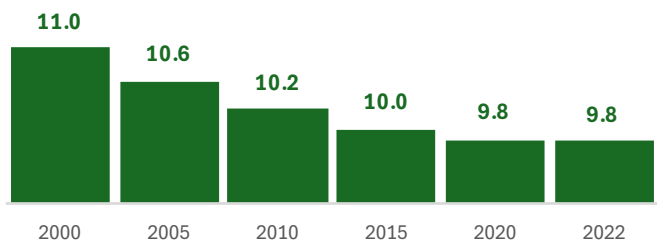
*Thailand's road network is comprised of 6.1% motorways, highways, and primary roads and 93.9% secondary roads, local roads, and other roads*

Road infrastructure availability (2022)  
**9.8 kilometers per thousand population**

Road infrastructure density (2022)  
(1,2) **1,376 meters per square kilometer** (1,3)

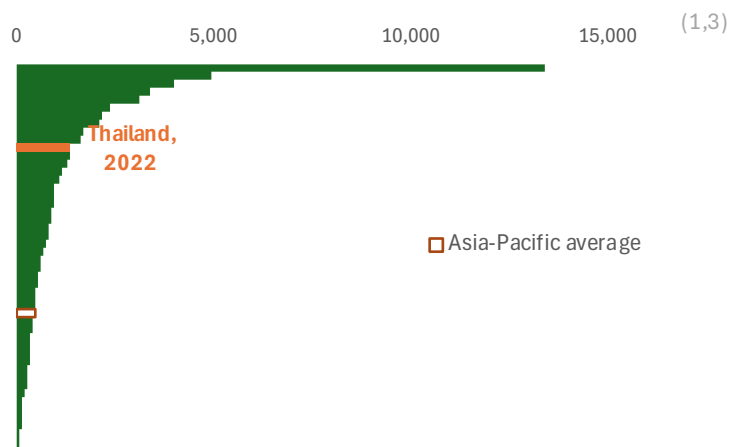
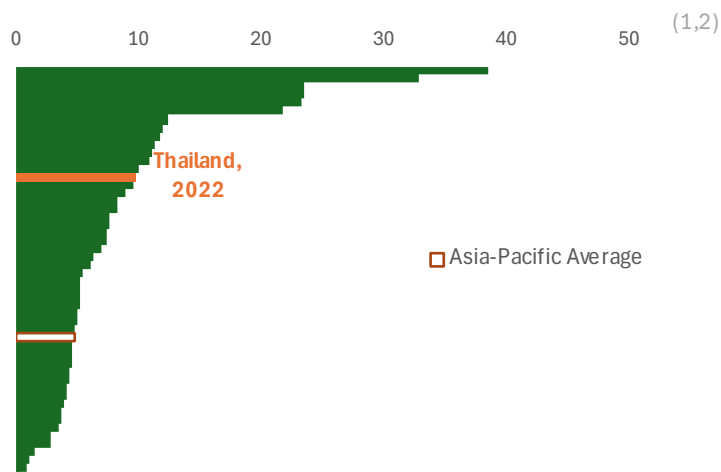
Road infrastructure availability trend, kilometers per thousand population

Road infrastructure density trend, meters per thousand population



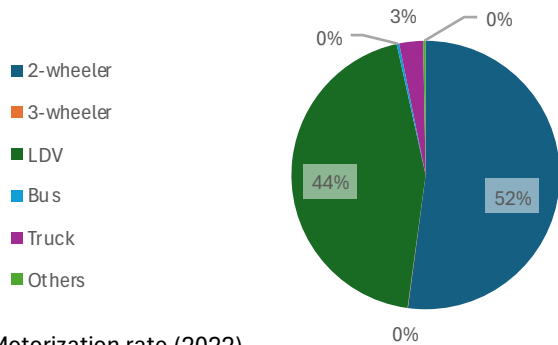
Road infrastructure availability in Asia-Pacific, kilometers per thousand population

Road infrastructure density in Asia-Pacific, meters per square kilometer



Road vehicles (2022)  
**42.76 million vehicles**

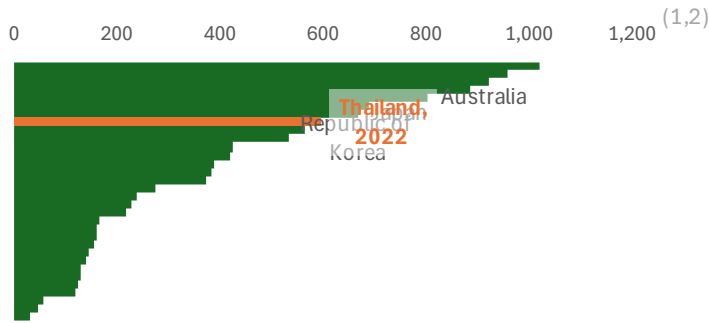
Share of vehicles by type



Motorization rate (2022)  
**596 vehicles per thousand population**

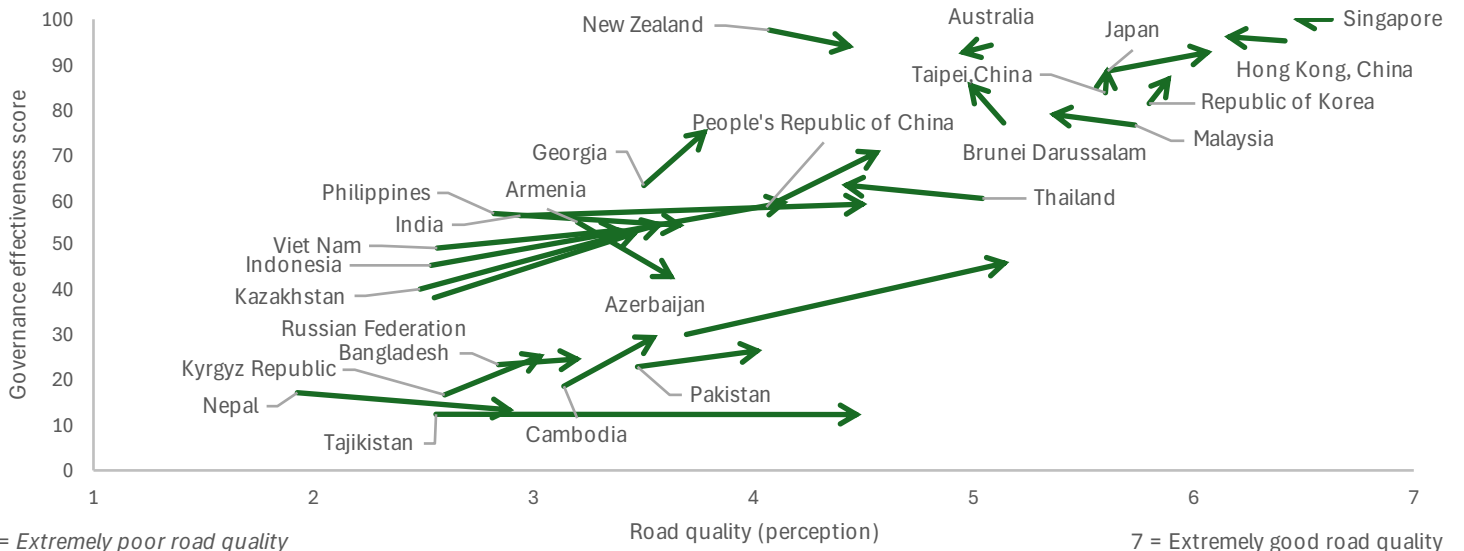
*In 2000, Thailand had 328 vehicles per thousand population. By 2022, this has increased to 596 compared with Asia-Pacific average of 577 in 2022.*

Motorization rate in Asia-Pacific, vehicles per thousand population



*Road vehicles include 2- and 3-wheelers, LDVs, buses and other informal public transport, trucks, and other unclassified types*

Road quality (perception) vs. governance effectiveness score (2009-2019)



1 = Extremely poor road quality

7 = Extremely good road quality

Developed with the support of:



Public-private partnership investments in road sector, cumulative million USD

(1)

Share of road in total public-private partnership investments

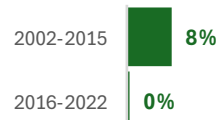
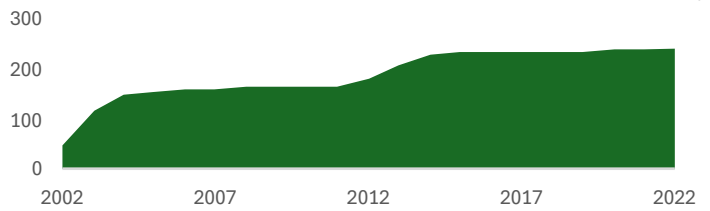
Official development assistance in road sector, cumulative million USD

(1,2)

(5)

Share of road in total official development assistance

(5)



Quality of Life and Fostering Inclusive Growth

Rural access index (2023)  
**93%**

(6)

Based on 2015 estimates, only 45% of the population could reach the nearest city in 30 minutes, another 19% could reach in 1 hour, and another 34% could reach only after 3 hours.

Rural population without access to all-season roads (2023)  
**2.16 million**

(2,6)

Logistics performance index score (2023)

**3.5/5**

(10)

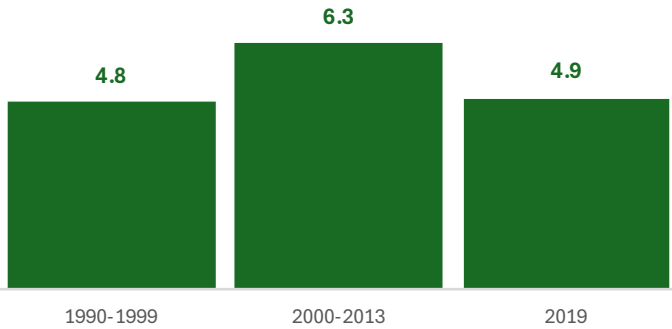
| Infrastructure score

(7)

**3.7/5**

(10)

National street network disconnectedness index



This indicator is a summary scalar measure for street-network sprawl describing connectivity of local street networks across the world

Logistics performance index ranking trend

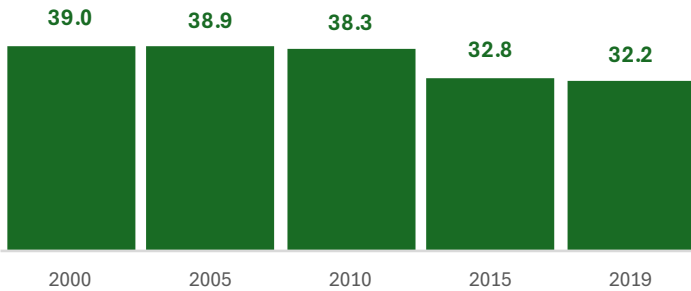


(10)

Road crash fatalities (2019)  
**22.4 thousand deaths**

(8)

Road crash fatality rate per 100 thousand population



Asia-Pacific average is 15.7 fatalities per 100 thousand population

Percent of firms choosing transportation as their biggest obstacle - Manufacturing (2016)

**17.9%**

(11)

Percent of respondents answering high/very high - Level of Fees and Charges on Road transport

**n.d.**

(11)

Level of fees and charges for less than full truck loads are considered

Mean speed in Asia-Pacific, kilometers per hour (2022)

0 20 40 60 80 100 120 (9)



Mean speed (2022)  
**86 kilometers per hour**

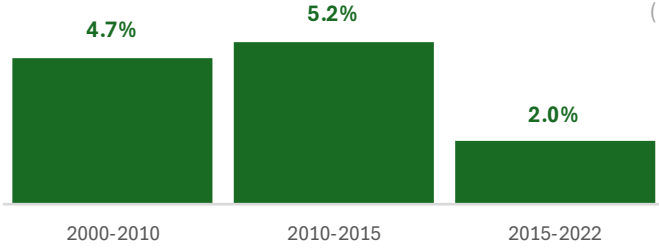
(9)

Employment in transport sector (2022)  
**1.76 million employees**

Share of transport sector in total employment (2022)  
 (12) **4.3%** (12)

Average annual growth rate of transport sector employment

Share of females in total transport sector employment (2022)  
 (12) **20.2%** (12)

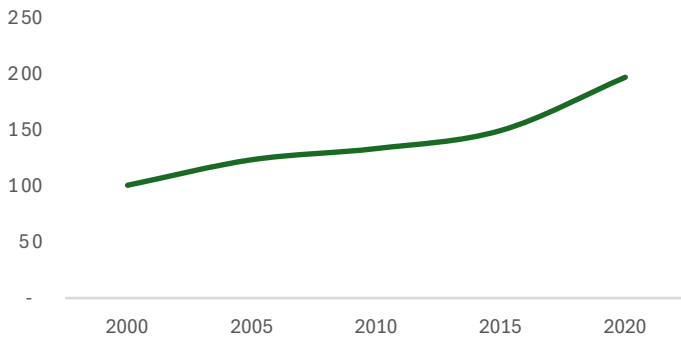


## Decarbonization

Road transport energy consumption trend

Assuming 2000 value as base (100)

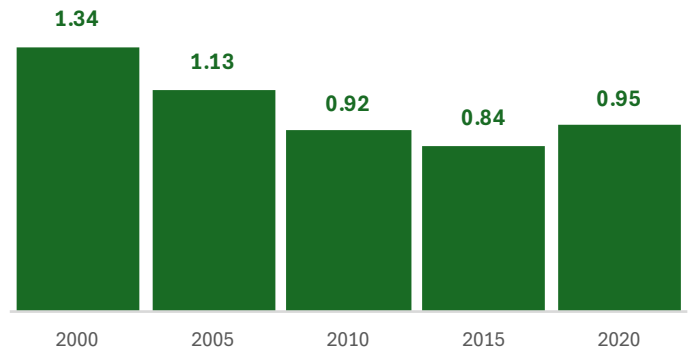
(13) **97% of Thailand's transport energy consumption is in the road sector.**



*Between 2000-2010, Thailand's road transport energy consumption grew 2.9% annually. Between 2010-2020, road transport energy consumption grew 4.0% annually.*

Road transport energy intensity with GDP, TJ per USD (PPP)

(3,13)



Asia-Pacific average is 0.4 MJ per USD in 2020

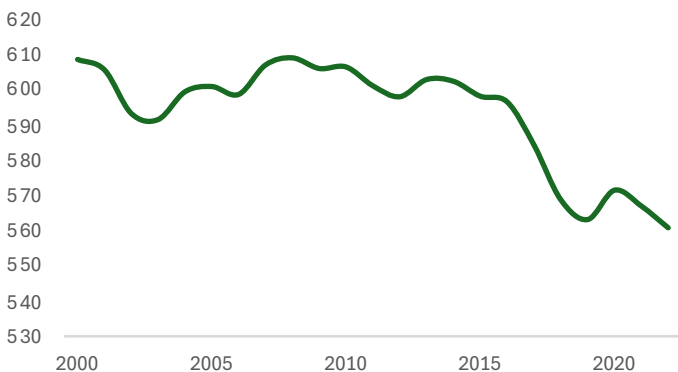
Grid emission factor (2022)

**560.7 gCO2 per kWh**

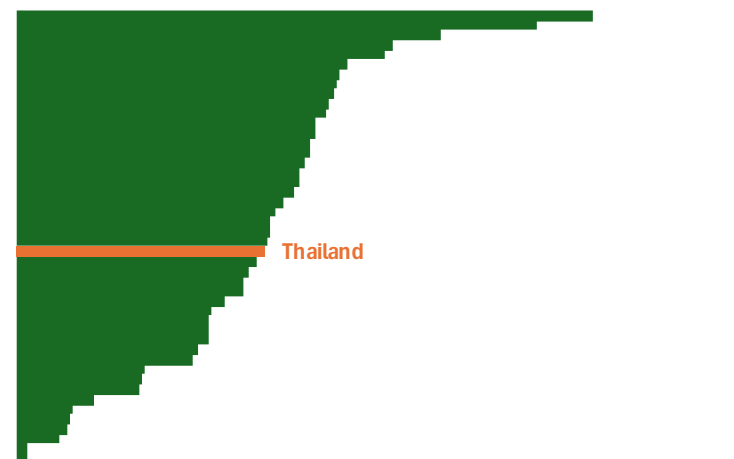
Grid emission factors in Asia-Pacific, gCO2 per kWh

(14) 0 200 400 600 800 1000 1200 1400 (14)

Grid emission factor trend, gCO2 per kWh

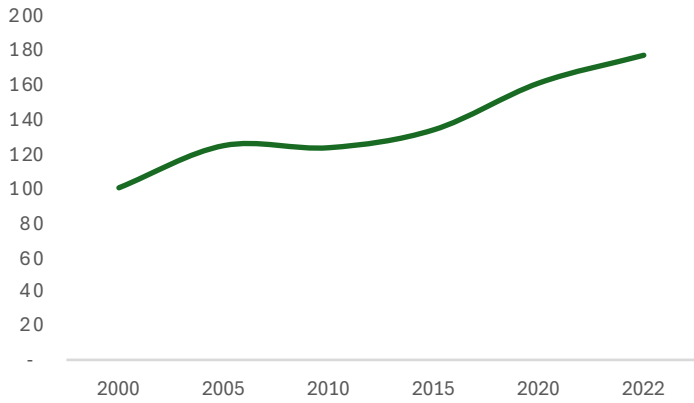


(14)



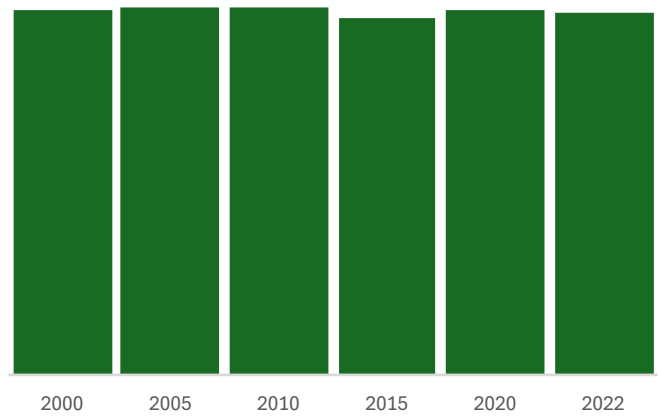
## Road transport CO2 emissions trend

Assuming 2000 value as base (100)



## Share of road transport in total transport CO2 emissions

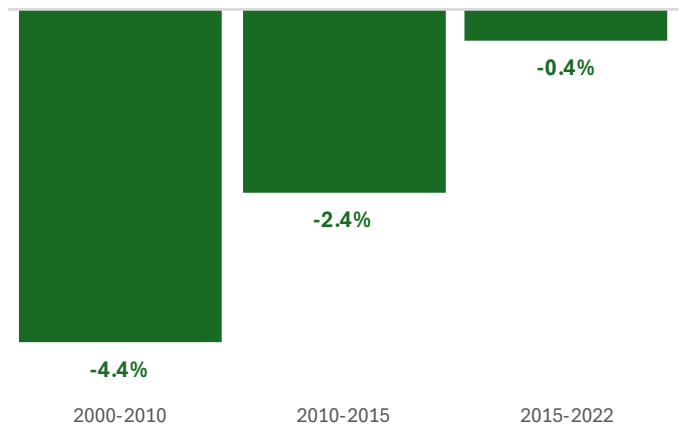
(15)



Between 2010-2019, Thailand's road transport fossil CO2 emissions was growing 3.0% annually. After the COVID-19 pandemic, road transport CO2 emissions was growing 4.9% annually.

## Road transport CO2 emissions intensity with GDP trend

(3,15)



## Transport fossil fuel subsidies, cumulative from 2010 to 2022

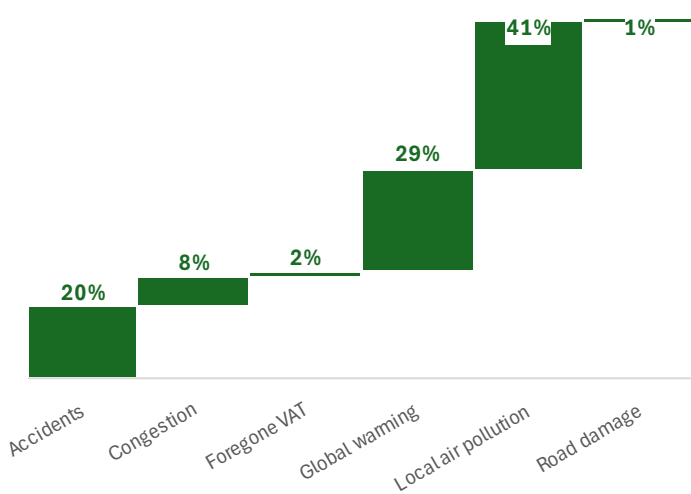
**155 million USD**

0.0% of Asia-Pacific total

(16)

## Implicit fossil fuel subsidies due to externalities

(17)



Data includes all sectors and all fuel types

Climate Resilience and Disaster Preparedness

Expected annual damages to road and rail infrastructure due to hazards (2019)

**148.95 million USD**

(18)

National road vulnerability index ranking (2023)

**n.d.**

(20)

Share of road in total transport infrastructure in multihazard average annual loss to transport infrastructure (2023)

**78.0%**

(19)

Share of population in low elevated coastal zones (2018)

**10.3%**

(21)

Pollution, Water and Land Management, Preserving Biodiversity, and Sustainable Materials

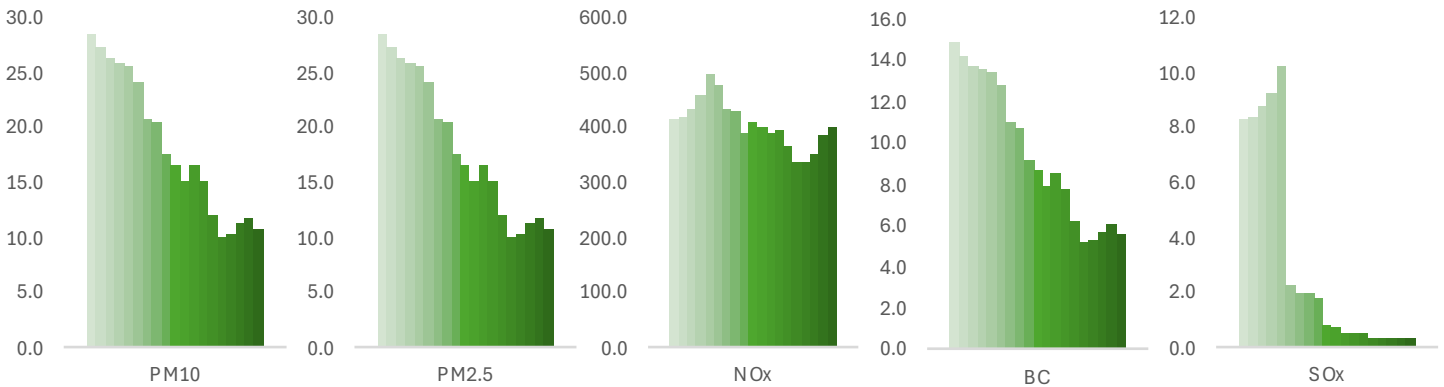
Paved roads (2020)

**58%**

(1)

Road transport air pollutant emissions, thousand tonnes (2000-2018)

(15)



In 2022, road transport contributed 45.7%, re-suspended dust contributed 36.3% in transport PM10 emissions. In total, road transport contributed about 10.8% in total PM10 emissions in Thailand.

Deaths due to occupational exposure to diesel engine exhaust | 2000-2010

**2,381 deaths**

| 2011-2018

**2,496 deaths**

(22)

Terrestrial and marine protected areas (2022)

**13.3%**

(3)

(% of total territorial area)

Terrestrial protected areas

**18.5%**

(13)

(% of total land area)

Marine protected areas

**4.4%**

(3)

(% of territorial waters)

Share of biofuels in road transport energy consumption (2020)

**9.0%**

Domestic consumption per capita, tonnes (2024)

| Thailand

**11.4 tonnes**

| Asia-Pacific

**13.8 tonnes**

(23)

Forest area (2021)

**38.8%**

(3)

(% of land area)

Domestic consumption is the total amount of materials directly used in the economy (used domestic extraction plus imports), minus the materials that are exported.

## Policy Measures

Policy document	Year	Road-related measures
Climate change Master Plan 2015-2050	2015	Active transport infrastructure expansion, Disaster notification/ early warning system, Fossil fuel subsidy elimination, Fuel tax, Road charging and tolls, Vehicle taxes, Development of transport plan/ policy, Ecodriving
Strategies for the Development of Thailand's Transport System for a 20-Year Period (2018-2036)	2019	Active transport infrastructure expansion, General infrastructure improvements, Reduction of transport/ logistics costs, Vehicle inspection and maintenance, Target - Transport activity, General transport finance
Thailand Greenhouse Gas Reduction Action Plan for Transport Sector	2021	Active transport infrastructure expansion, General infrastructure improvements, Fuel tax, Road charging and tolls, Vehicle taxes, General transport finance, Investment required for specific projects, Ecodriving
Thailand Road Safety Master Plan 2022-2027	2022	General infrastructure improvements, Vehicle inspection and maintenance, Automated enforcement of speed limits, Technical standards for road infrastructure, Implementation of horizontal deflections on roads, Implementation of narrowing of roads, Implementation of vertical deflections on roads, Upgrading high risk locations for road safety, National road safety strategy, National speed law, Audits/ star rating for existing roads for road safety, Audits/ star rating required for new road infrastructure for road safety
Global Status Report on Road Safety 2018	2018	Design standards for sidewalks and bicycle paths, Upgrading high risk locations for road safety, National road safety strategy, National speed law, Audits/ star rating for existing roads for road safety, Audits/ star rating required for new road infrastructure for road safety
The Thirteenth National Economic and Social Development Plan (2023-2027)	2023	General infrastructure improvements, Reduction of transport/ logistics costs, Disaster notification/ early warning system, General transport finance, Development of transport adaptation/ emergency/ disaster plan/ policy
Mid-century, Long-term Low Greenhouse Gas Emission Development Strategy	2021	General infrastructure improvements, Surface treatment resurfacing, Fossil fuel subsidy elimination
Action Plan on Thailand Logistics Development 2023-2027	2023	General infrastructure improvements, Reduction of transport/ logistics costs, General transport asset management, General transport finance, Road infrastructure expansion
Oil Plan 2015-2036	2015	Fuel tax, General transport finance, Ecodriving
Voluntary National Review 2021	2021	Road infrastructure expansion, National road safety strategy
Updated Nationally Determined Contribution - THA	2020	Vehicle taxes
Strategic Plan of the Ministry of Transport 2017-2021	2017	General transport asset management, Measures to improve rural-urban connectivity, Road infrastructure expansion, Upgrading high risk locations for road safety
Intended Nationally Determined Contribution (INDC)	2015	Disaster notification/ early warning system, Vehicle taxes
Thailand Energy Efficiency Development Plan 2015-2036	2015	Fossil fuel subsidy elimination, Fuel tax, Vehicle taxes, Ecodriving
Thailand's Electric Vehicle policies	2022	Vehicle inspection and maintenance
National Strategy 2018-2037	2019	General infrastructure improvements, Reduction of transport/ logistics costs
Vehicles Act, B.E. 2522	1979	Vehicle inspection and maintenance, General transport finance
Transport Infrastructure Development Strategy 2015-2022	2015	Road infrastructure expansion
Road Safety Opportunities and Challenges: Low- and Middle-Income Country Profiles	2020	Vehicle inspection and maintenance, Implementation of vertical deflections on roads
Road Traffic Act - THA	1979	National speed law, Passenger and freight load limits, Road-side checks on overspeeding

## Policy Targets

Policy document	Target year	Road-related targets
Action Plan on Thailand Logistics Development 2023-2027	2027	Transport cost to GDP reduces to 5 percent
Strategies for the Development of Thailand's Transport System for a 20-Year Period (2018-2036)	2036	Logistics costs per gross domestic product (GDP) = Present (2016) 13.9% Target (2036) 11.9 percent Transportation costs per gross domestic product = Present (2016) 7.5% Target (2036) 6.7 percent
Strategies for the Development of Thailand's Transport System for a 20-Year Period (2018-2036)	2036	Proportion of the volume of freight by rail = Present (2015) 1.4% Target (2036) Percent 10% Proportion of volume of water transport = Present (2015) 11.44% Target (2036) 19 percent



## Notes



(\*) Policy measures and targets were extracted from policy documents as listed in the ATO National Transport Policies Database

<https://bit.ly/ATOpolicyrepository>

## References

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- (9) Moszoro & Soto (IMF, 2022), <https://www.imf.org/en/Publications/WP/Issues/2022/05/20/Road-Quality-and-Mean-Speed-Score-518200>
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- (23) Global Materials Flow Database (UNEP, 2023), <https://www.resourcepanel.org/global-material-flows-database>

## Disclaimer

This profile was developed by Asian Transport Outlook in support of TA-6756 Improving Infrastructure Sustainability Through Better Asset Management – Developing a Green Roads Toolkit and Guidance for ADB Projects. The ATO is an initiative developed under TA-6763 REG: Accelerating Innovation in Transport - Asian Transport Outlook: Phase 3 (55119-001) of the Asian Development Bank (ADB) and is also being supported by the Asian Infrastructure Investment Bank (AIIB) through Purchase Order No. CW39446 AIIB Support: Asian Transport Outlook Phase 3.

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