Modal Shift Transportation Trend in Thailand

YAMADA Consulting Group

Contents

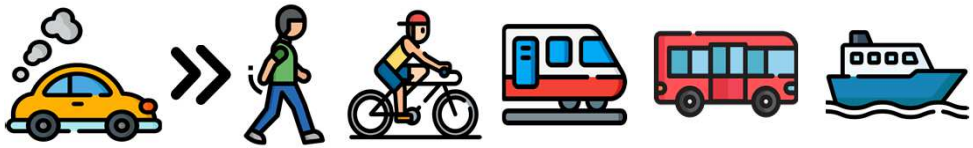
Introduction of Modal Shift Transportation

What is Modal Shift Transportation?

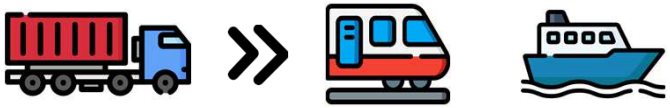
Modal Shift Definition

- The modal shift is switching or shifting method of transportation or transportation modes.
- In this case, it refers to shifting towards more environmentally friendly and efficient modes such as from road to railway or maritime, or from private vehicles to public transportation which are more convenient, cost and time saving, and less green house gas (GHG) emissions.

Modal Shift Passengers Transportation



Modal Shift Freight Transportation



Modal Shift Transportation's Key Drivers and Benefits

Key Drivers

Traffic

- Thailand, especially Bangkok, is notorious for traffic congestion due to insufficient and poor-quality public transportation, so most people use private cars instead.

Cost

- For transportation by road both passengers (private cars) and freight (trucks), the cost is more expensive compared to other modes, being mainly driven by oil price.

Environment

- GHG emissions in the transportation sector are mainly caused by road transportation, which harmful to the environment and human health as it generates air pollution.

Benefits

These key pain points will be alleviated by shifting to more efficient transportation modes, especially railway and maritime modes.

Major Benefits

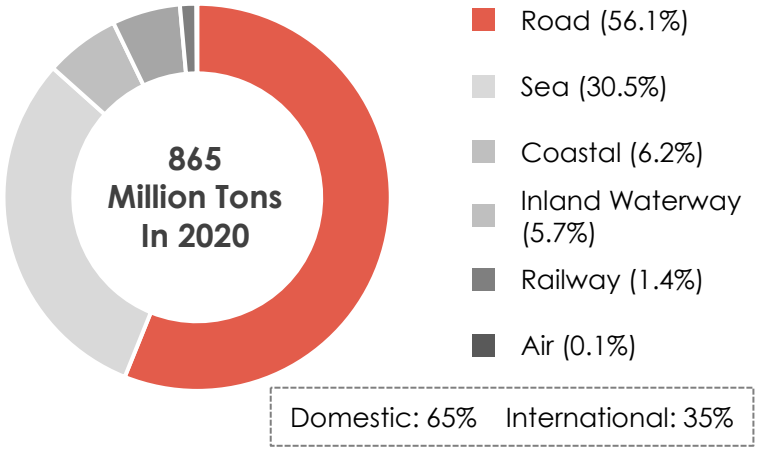
- Alleviating traffic congestion
- Transportation cost reduction
- GHG emissions reduction and more environmentally friendly which are currently the global trends.

Overview of Transportation in Thailand: Freight Transportation

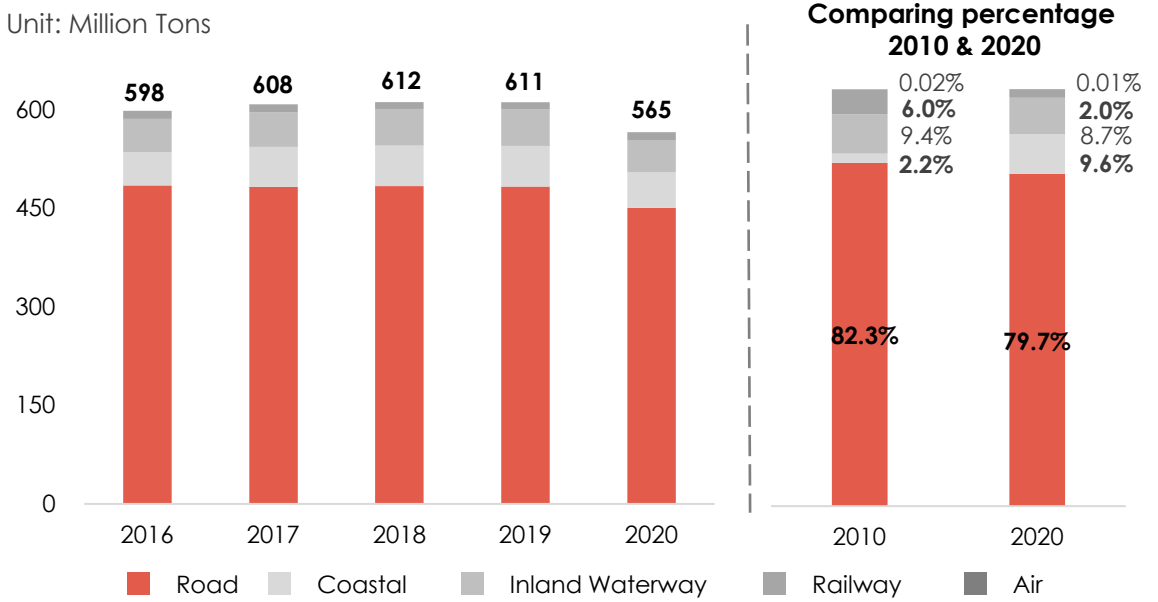
Freight Volume by Mode of Transportation

- Thailand freight transportation volume had increased during 2016-2018, both domestic and international. However, the global economic slowdown in 2019 and the COVID-19 pandemic caused the level of freight to decrease in 2019 and 2020.
- For total freight transportation, road is the main transportation mode in Thailand, accounting for 56 percent while railway and air transportation are the least used.
- Domestic freight transportation is dominated by road, accounting for almost 80 percent due to its extensive infrastructure, speed, and convenience. Also, other modes such as railway are not well developed.
- Comparing between 2010 and 2020, there are 3 key changes. Coastal freight increased due to more infrastructure development. Road freight slightly decreased because customers shifted to other modes. Rail freight also decreased due to poor service.

Total Freight Transportation by Mode (2020)

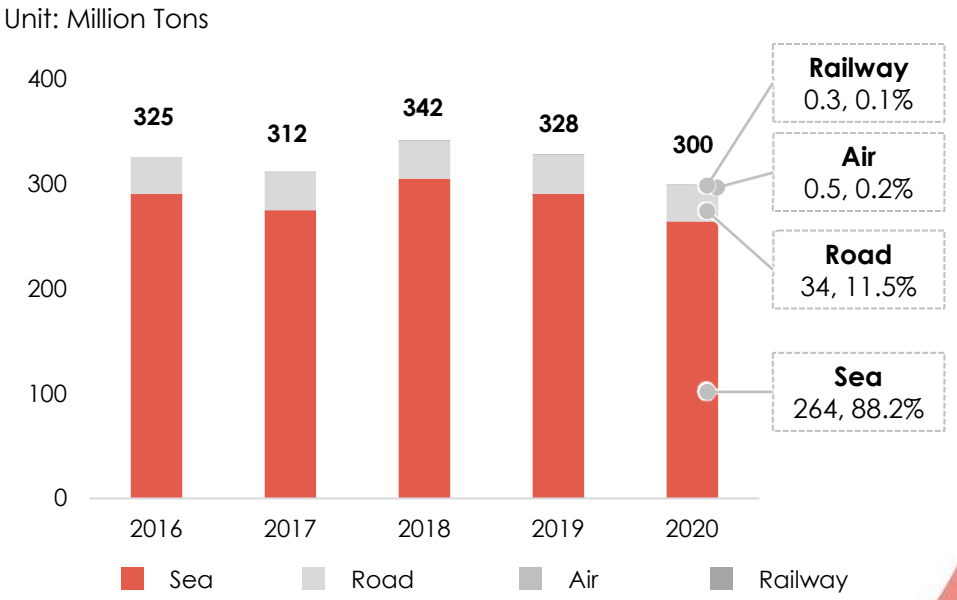


Domestic Freight Transportation by Mode (2016-2020)



Source: Ministry of Transport

International Freight Transportation by Mode (2016-2020)



Source: National Economics and Social Development Council (NESDC)

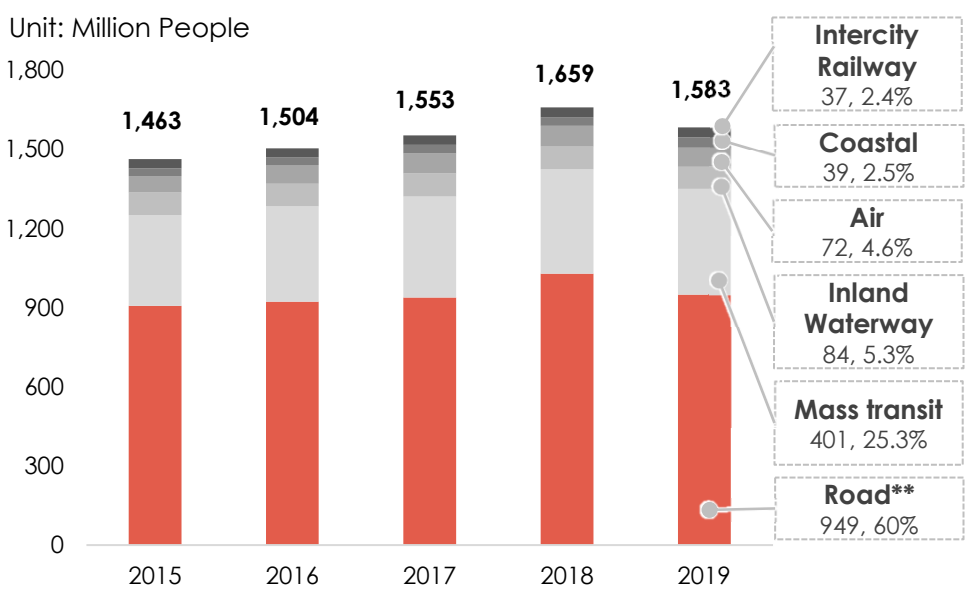
Overview of Transportation in Thailand: Passenger Transportation

Number of Domestic Passengers by Mode of Transportation

- Thailand domestic passengers' transportation slightly increased from 2015 to 2018. However, it slightly decreased in 2019, caused by the reduction of road transportation.
- Domestic passenger transportation mode is dominated by road, accounting for 60 percent. One of the main drivers is that road is the most extensive transportation infrastructure in Thailand, so it is more convenient for people to travel by compared to other public transportation modes.
- Mass transit railway is the second most popular mode for passenger transportation, accounting for 25 percent. Also, the number of passengers has been increasing since 2015 due to its infrastructure development.

Note: *Number of domestic passengers presented only includes passengers who travelled by public transportation
**Road transportation does not include Bangkok public bus under Bangkok Mass Transit Authority

Domestic Passengers Transportation* by Mode (2015-2019)



Source: Ministry of Transport

Transportation Infrastructure by Major Modes

Road

- In 2022, Thailand has a total road network accounting for 702,965 km and is considered the most extensive transportation infrastructure.
- The major road infrastructure is local roads, under the department of local administration, accounting for around 85 percent of total length.

Railway

- In 2020, Thailand has a total rail network of 4,997 km.
- 80 percent of the total length is single track, followed by dual and triple track.
- Intercity railway is the longest line, accounting for 96 percent, while the remainder is electric railway in BMR.

Port

- In 2020, Thailand has a total of 1,199 ports, of which around 99% are domestic ports and river ports while the remaining 1% are international ports.
- International ports dominate maritime transport, if which the main ports are Bangkok, Laem Chabang and Map Ta Phut ports.

Airport

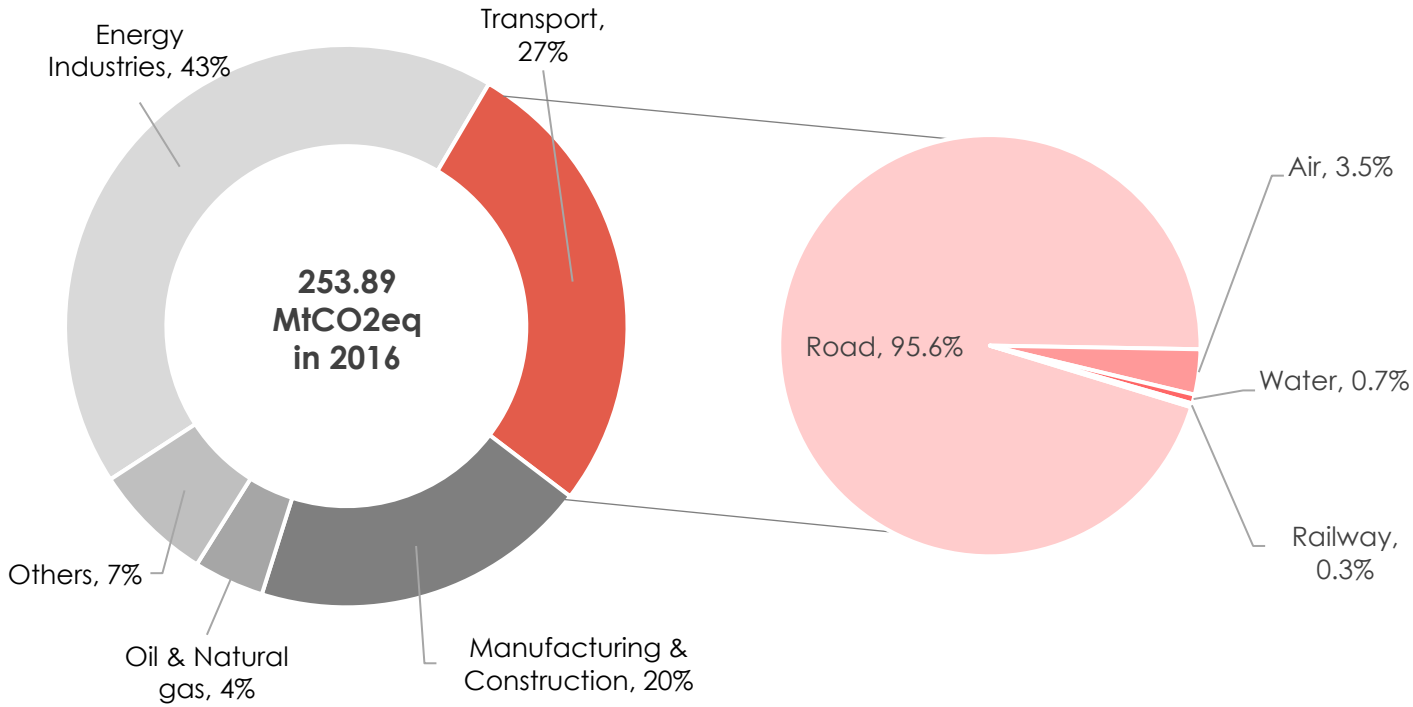
- As of 2021, Thailand has a total of 38 airports, which consist of 27 domestic airports and 11 international airports.
- The densest airport in terms of both passengers and freight volume is Suvarnabhumi airport.

Source: Ministry of Transport, State Railway of Thailand, Marine Department, Airports of Thailand Public Company Limited (AOT)

Main Driver of Modal Shift Transportation Trend in Thailand

- There are many key drivers and benefits of modal shift transportation in Thailand. However, the main driver that encourages the government to promote this trend is the GHG emissions reduction from transportation sector.
- From transportation statistics presented, road is the major mode of transportation in Thailand for both freight and passengers, which results in substantial amount of GHG emission in transportation sector.
- According to Thailand Third Biennial Update Report by UNFCCC (2020), transportation was the second largest GHG emission contributing sector, accounting for 27 percent or 68.3 MtCO2eq of total contribution in energy sector in 2016*, and road was the major mode causing GHG emission in transportation sector.
- With the adoption of modal shift transportation, road transportation can be potentially decreased, resulting in a reduction of GHG emissions.

Total GHG Emissions in Energy Sector (2016)



Note: *The latest information of GHG emissions in Thailand is in 2016, as the Biennial Update Report can report latest data 4 years prior to the published year due to difficulty of gathering information from various organizations.

Source: Thailand Third Biennial Update Report (UNFCCC) (2020)

Thai Government's Global Commitment towards Climate Change

- As global warming and climate change have been impacting the world, many global organizations are ambitiously trying to save the world from these global issues. Thus, they introduced several global commitments among countries to prevent, reduce, and limit dangerous human induces that are the major causes of these issues.
- Thailand has been concerned about these global problems and participating in various global commitments.

Thai Government's Global Commitment towards Climate Change

1989 — Montreal Protocol

- Thailand participated as a member state of the **Montreal Protocol** on substances that deplete the ozone layer.

1994 — Ratified UNFCCC

- Thailand participated as a member state of the **United Nations Framework Convention on Climate Change (UNFCCC)**

2002 — Ratified Kyoto Protocol

- Thailand made the pledge in the **Kyoto Protocol** to **reduce overall GHG emissions from 2008-2012 by at least 5%** below 1990 levels.

2014 — COP20

- Thailand submitted **nationally appropriate mitigation action (NAMA)** pledging to **reduce its GHG emission by 7-20%** from the projected BAU level **by 2020.**

2016 — Ratified Paris Agreement

- Thailand submitted the **Nationally Determined Contribution (NDC)** to **reduce GHG emissions by 20%** from the projected BAU level **by 2030** could be increased to 25% with support.

2021 — COP26

- Thailand aims to reach **carbon neutrality in 2050, net zero emissions by 2065**, and increases **GHG emissions reduction target in NDC to 40%.**

Source: United Nations Climate Change, ASEAN Secretariat, Public news

Government Plans on GHG Emissions Reduction in Transportation Sector

- After participating in several global commitments towards climate change along with other countries, Thailand initiated various plans to achieve its goals, including Thailand's climate change master plan 2015-2050 as a main solid guild line.
- There are 4 main sectors that the country acknowledges their potential and has been concentrating on them in order to reach the GHG emission reduction target, so NDC action plans 2021-2030 for each target sector are initiated by related government agencies.

Government Plans to tackle Climate Change

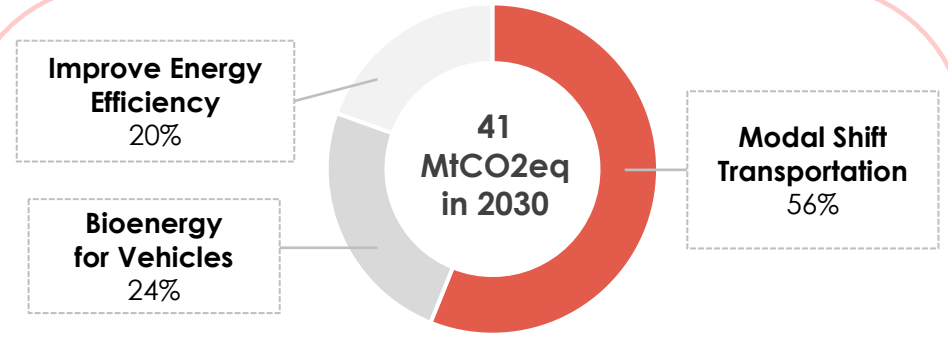
Thailand's Climate Change Master Plan 2015-2050

Thailand Ratified Paris Agreement in 2016

Other Related National Plans

Thailand's NDC Roadmap on Mitigation 2021-2030

- **NDC Action Plan (Energy Sector) 2021-2030**
- **NDC Action Plan (Transportation Sector) 2021-2030**
- **NDC Action Plan (Waste Sector) 2021-2030**
- **NDC Action Plan (Industrial Processes and Product Use Sector) 2021-2030**



Source: The Office of Natural Resources and Environmental Policy and Planning

- According to The Office of Natural Resources and Environmental Policy and Planning (ONEP), Thailand targets to reduce total GHG emissions of 115.6 MtCO2eq in 2030, and 35 percent or 41 MtCO2eq will be reduced in transportation sector.
- With ambitious targets in the transportation sector, there are 3 major strategies that have been adopted in order to achieve the reduction target including modal shift transportation, bioenergy, and improving energy efficiency, respectively.
- Modal shift transportation is the major strategy that the government is concentrating on, accounting for 56 percent or 23 MtCO2eq of total GHG emission reduction target in the transportation sector.

Source: Thailand's Nationally Determined Contribution (NDC) Roadmap on Mitigation 2021-2030

Government Plans on GHG Emissions Reduction in Transportation Sector: Modal Shift

NDC Action Plan 2021-2030 (Transportation Sector)

A-S-I Approach

- A-S-I approach is the key concept adopted in order to systematically group and analyze each action plan consisting of 3 elements as follow;

	Objectives
A (Avoid or Reduce)	Reduce or avoid the unnecessary need to travel
S (Shift or Modal Shift)	**Shift to more environmentally friendly transportation modes**
I (Improve)	Improve transportation modes (energy efficiency) and vehicles efficiency

Example of Other Intermodal projects

- Aside from the NDC action plan, the modal shift trend is also supported by intermodal projects such as:

Land Bridge Project (Under Construction)

➢ Land bridge project connects the Andaman Sea and the Gulf of Thailand by railways and motorways transportation.

Single Rail Transfer Operator (SRTO) at Lam Chabang Port (Commercially used since 2018)

➢ The project consists of dual track railway connected from Lam Chabang station to port, rail yard, and stabling yard etc.

Modal Shift Plans 2021-2030

- The objective of modal shift plans is to encourage the usage of public transportation, especially from road to railway mode for both passengers and freight transportation.

Existing Projects and Plans: focusing on transportation infrastructure development plans

Railway Transportation

Construction of
- 32 routes of dual-track railway
- 20 routes of mass transit and commuter trains
- 14 routes of intercity railway, 4 high speed trains

Total Budget: 3.035 Trillion THB

Maritime Transportation

- Construction of Navigation dams on Chao Phraya and Nan rivers
- Improve freight transportation efficiency on Pasak river
- Develop ports and ferry connections in the upper Gulf of Thailand
- Develop Lam Chabang and Map Ta Phut Ports Phase 3

Total Budget: 176 Billion THB

Recommended Projects and Plans: potential plans that should be enacted

- Promoting non-motorized transport(NMT), such as walking and bicycles, for connecting with other public transportation by improving sidewalks and bicycles lanes in BMR and other 6 provinces.
- Improve services quality of public transportation

Total Budget: 750 million THB

Source: NDC Action Plan 2021-2030 (Transportation sector), Public news

Key Stakeholders in Modal Shift Transportation

Key Stakeholders

Public Sector

Major Transportation Operators

Railway Transportation

The State Railway of Thailand (SRT) under the Ministry of Transport (MOT)

- Operating all national rail lines including intercity passengers and freight rail services, SRT commuter trains, and Airport Rail Link (ARL)

Mass Rapid Transit Authority of Thailand (MRTA) under the Ministry of Transport (MOT)

- The owner of all Mass Rapid Transit (MRT) in BMR and other provinces

Bangkok Metropolitan Administration

- The owner of BTS lines (partial)

Maritime Transportation

Port Authority of Thailand (PAT) under the Ministry of Transport (MOT)

- Operating total of 5 major ports such as Lam Chabang and Bangkok ports.

Marine Department under the Ministry of Transport (MOT)

- Operating more than 160 ports both passengers and freight.

Industrial Estate Authority of Thailand (IEAT) under the Ministry of Industry

- Operating Map Ta Phut Industrial Port

Other Related Government Agencies

Examples of Major Related Government Agencies that Support Modal Shift Action Plans

- Department of Highways, Department of Land Transport, Department of Rural Roads
- The Office of Transport and Traffic Policy and Planning (OTP)

Private Sector

Major Transportation Operators

Railway Transportation

- **Bangkok Mass Transit System Plc. (BTSC)**: Operating all BTS sky train systems (some parts granted concessions from BMA)
- **Bangkok Expressway and Metro Plc. (BEM):** Operating MRT system (granted concessions from MRTA)

Maritime Transportation

There are 3 major players including

- **UniThai Group** operating United Thai Container Terminal (UTCT)
- **Sahathai Terminal Plc.** operating Sahathai Terminal
- **Sriracha Harbor Plc.** Operating Sriracha Harbor (SRH)

Contractors

- There are various infrastructure contractors in Thailand, both Thai and international companies.
- There are 3 major players consisting of **Italian Thai Development Plc., Sino-Thai Engineering & Construction Plc., Ch. Karnchang Plc.,** respectively.

Engineering Consulting Companies

- Consulting companies are also considered as key stakeholders because before construction, environmental and feasibility studies as well as design and other engineering consulting needs to be conducted,
- Currently there are many potential related consulting companies that specialize in offering consulting services in transportation infrastructure.

Source: NDC Action Plan 2021-2030 (Transportation sector), government agencies' and companies' official websites

Law and Regulations regarding Modal Shift Transportation Trend (1/2)

- According to the Foreign Business Act B.E. 2542 (1999), if foreign companies, which have half or more of shares held by non-Thais, wish to operate certain business activities in response to the modal shift transportation trend in Thailand, they will encounter some limitations and are required to strictly follow procedures.
- Foreign workers are also prohibited to be employed in certain occupations in Thailand according to the Notification of the Ministry of Labor RE: Prescription of the Prohibited Occupations for Foreigners B.E. 2563 (2020)
- However, there are still some exceptional cases that foreign companies and workers are allowed to do business in Thailand.

	Business Categories in the Foreign Business Act	Major Restrictions to Operate Related Business Activities
Transportation Operators 	List 2: Businesses related to national safety or security, or having impacts on arts, culture, traditions, customs and folk handicraft, or natural resources and environment	▪ Operating transportation is a business related to national safety or security, which falls into a subcategory of domestic transportation by land, water or air, including domestic aviation as stated in the Foreign Business Act B.E. 2542 (1999). ▪ Foreign companies are required to obtain cabinet approval prior to engagements in such business activities
Construction 	List 3: Businesses in respect of which Thai nationals are not ready to compete with foreigners	Foreign companies wishing to operate construction businesses in Thailand are required to obtain a foreign business license prior to commencement **except:** ▪ Foreign companies with at least 500 million THB capital from foreigners can operate construction of infrastructure in public utilities communications requiring tools, technology or special expertise in such construction without obtaining a Foreign business license. ▪ Construction of other types as prescribed in the Ministerial regulation.
Related Consulting services 		Foreign companies wishing to operate related consulting services in Thailand are required to obtain a foreign business license, including provision of engineering services and architectural services **Restrictions for foreign workers**: engineering and architectural works are prohibited to foreign workers including: ▪ Civil engineer work concerning counselling, project planning, design and calculation, construction supervision or manufacturing, inspection, administration work to organize system, research, test. ▪ Professional architectural work concerning project study, design, construction management and supervision, inspection or consulting. However, there are some exceptional cases as stated in the Notification of the Ministry of Labor RE: Prescription of the Prohibited Occupations for Foreigners B.E. 2563 (2020)

Source: Foreign Business Act B.E. 2542 (1999), Notification of the Ministry of Labor RE: Prescription of the Prohibited Occupations for Foreigners B.E. 2563 (2020)

Laws and Regulations regarding Modal Shift Transportation Trend (2/2)

- In order to engage in public transportation infrastructure projects, there are some restrictions for foreign business operators.
- For construction, companies are required to register with the Comptroller General's Department under the Ministry of Finance prior to the submission of proposals for some types of construction projects. However, foreign companies are not eligible for this registration as stated in the related regulations.
- For related consulting services, companies are required to register with the Consultant Database Center under the Ministry of Finance prior to submission of proposals, but only Thai-majority companies are eligible for this registration.

	Major Restrictions for Engaging in Public Transportation Infrastructure Projects	Exceptional Cases
Construction 	**Types of construction requiring registration** ▪ Roads ▪ Bridges (i.e. overpass, underpass, elevated highway, and jetty) ▪ Irrigation systems ▪ Channel dredging ▪ Seawalls/revetments ▪ Offshore construction **Eligibility for registration & tendering proposals** ▪ Company Limited: ≥51% of the company's capital shares are held by Thai natural/ juristic persons AND more than half of the directors are Thais ▪ Public Company Limited: ≥50% of the company's capital shares are held by Thai natural/ juristic persons AND more than half of the directors are Thais ▪ Both company limited and public company limited need to be legally registered and have an office in Thailand. Notification of Central Price and Business Operation Registration Committee Re: Rules, Procedures, and Conditions for the Construction Business Registration Eligible for Submitting Proposal to Public Agency B.E. 2560 (2017)	Foreign construction companies can engage in mega public transportation infrastructure projects through International Competition Bidding (ICB) with specifications as follows; ▪ The project worth is no lower than 5 billion THB investment ▪ Sophisticated projects that requires specialized technique, advanced technology, and specialized technician/ advanced construction professionals (i.e. elevated highways, underground tunnels, ports, airports, etc.) Cabinet Approval on February 28, 2017 regarding the rule of public procurement by international competition bidding
Related Consulting services 	**Eligibility for registration & tendering proposals** ▪ Legally registered in Thailand with purpose to operate consulting services ▪ At least 1 million THB registered capital ▪ ≥51% of the company's capital shares are held by Thai natural/ juristic persons AND more than half of the directors are Thais ▪ At least 2 Thai consultants AND more than half of the consultants are Thais Ministerial Regulation on Public Procurement and Supplies Administration B.E. 2560 (2017)	Foreign related consulting companies can engage in mega public transportation infrastructure projects through International Competition Bidding (ICB) with specifications as follows; ▪ The project worth is no lower than 1 billion THB investment ▪ Sophisticated projects requiring specialized technique, advanced technology, and new technology transferred. Cabinet Approval on February 28, 2017 regarding the rule of public procurement by international competition bidding

Challenges of Modal Shift Transportation Trend in Thailand

- Even though Thailand has been encouraging the modal shift transportation trend with action plans, there are various issues that might cause the country to take a longer time to adopt modal shift transportation, using rail and maritime transportation as major modes.

Freight Transportation Challenges

Railway

Rail freight transportation in Thailand, which is solely operated by the State Railway of Thailand (SRT) under the Ministry of Transport (MOT), has been perceived as poor service providers.

- Poor and limited infrastructure with insufficient supporting facilities and equipment for freight transportation such as rail yard for storing and loading goods.
- Most railways in Thailand are single-track causing increased transportation time and delays.
- Poor quality of service and lack of intermodal infrastructure to connect with railways.

Although there are many rail infrastructure construction plans to support the shift, it is difficult to enhance positive brand reputation and gain trust from potential customers. It is also challenging to improve facilities and services with management under SRT alone.

Maritime

- **Tidal current issues:** When rising tide occurs, some ships cannot pass underpass bridges while ebb tide prevents some ships to enter the ports.
- **Increase of logistic costs:** Economical and political issues are the main drivers that increase logistic costs. For example, the Russia and Ukraine situation led to the increase of oil prices, which is the main cost for maritime transportation. Inflation and depreciation of Thai Baht also increase logistic cost.
- **Problems from unprofessional management:** Management of some ports causing congestion, shipment delays, loading and unloading delays.

Passengers Transportation Challenges

Railway

Mass Transit (e.g. BTS, MRT)

- Mass transit price considered expensive compared to minimum wage.
- Insufficient feeder transport which transits passengers to mass transit stations such as bus, motorcycle, boats.
- Insufficient park & ride facilities

Intercity Railway

- Poor infrastructure and services
- Insecurity
- Taking longer time than other modes

Maritime

- Other transportation modes are more convenient and widely used with more extensive routes
- Long waiting time because of insufficient number of schedules
- Some routes are very crowded as the boats carry more passengers than the limit allows, causing risks of accidents
- Poor services and facilities (e.g. waiting areas, boarding point)
- Poor environment (e.g. unclean and smelly inland waterways)

The Delay of Transportation Infrastructure Projects

- Mega projects prior to the NDC plan are facing delays. The main factors causing the delays include:
  - COVID-19 (shutdown of construction),
  - Price fluctuation of construction materials,
  - Delay of land expropriation

Business Opportunities of Modal Shift Transportation Trend in Thailand

Business Opportunities for Thai and Foreign Companies

Given the government plan towards the modal shift transportation trend in Thailand, there is plenty of room and opportunities for related parties, both domestic and international, to be essential parts that drive the success of this trend.

Directly Related Industries

Transportation Operators

- Although there are only a few transportation operators in Thailand, it is possible to participate in upcoming transportation infrastructure projects.
- Currently, there is only SRT operating intercity rail transportation (freight). In the future, there is a possibility to allow private companies to participate in managing this rail transportation.

Contractors

- Various transportation infrastructure projects are considered as mega projects, of which contracts are divided into many phases, allowing a greater number of contractors to participate in each phase.
- There also room for foreign companies to participate in projects through International Competition Bidding (ICB).

Related Consulting Services

- More transportation infrastructure plans offer related consulting companies more services to provide, such as design, engineering and project management.
- There are still room for foreign companies to participate in projects to support special technical expertise through International Competition Bidding (ICB).

Indirectly Related Industries

Industries that support the improvement of railways and maritime transportation efficiency, such as:

- Feeder transport operators
- Electrical trains, bus and other vehicle providers
- Providers of technological solutions for transportation management, such as:
  - Big data analytics for freight and passengers' trips
  - Route optimization, vehicle planning, real-time tracking system

Conclusion

- The modal shift transportation trend in Thailand is mainly driven by traffic congestion, costs and especially environmental issues concerning with GHG emissions.
- Thailand's transportation, both freight and passenger, is dominated by road transportation causing large amounts of GHG emissions. However, as the Thai government participated in global commitments regarding the reduction of GHG emissions, they saw the potential to reduce emissions from the transportation sector by adopting the modal shift transportation trend, which shifts the mode from road to railway and maritime in order to meet the GHG emissions reduction target.
- The NDC action plan is implemented by Thai governmental agencies and consists of various transportation infrastructure projects. Thus, there are plenty of opportunities for key stakeholders, both Thai and international, to participate in.
- Even though business operators can seek opportunities by registering as foreign companies, there are still some obstacles and limitations. Thus, the recommendations are as follows:
  - ✓ Work closely with professional consulting companies to ensure smooth operations
  - ✓ Search for reliable Thai partners for business collaboration as Thai-majority companies to avoid encountering foreigners' limitations