



# Chapter 4

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## Sustainable Transport Systems in Lao PDR and Implications for ASEAN

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This chapter should be cite as:  
Purwanto, A.J., C.E.N. Setyawati and R.W. Bhaskara (2024), 'Sustainable Transport Systems in Lao PDR and Implications for ASEAN', in Phoumin, H. and A. Phongsavath (eds.), *Energy Security White Paper: Policy Directions for Inclusive and Sustainable Development for Lao PDR and the Implications for ASEAN*. Jakarta: ERIA, pp. 88-123.

# 1. Introduction

Since 2019, Lao People's Democratic Republic (Lao PDR) has been experiencing an increase in energy consumption for its transport sector. This increase has been driven not only by the completion of the high-speed Laos–China Railway (LCR) but more significantly by the rapid growth in the number of motor vehicles.

In 2016, there were around 365,000 cars and 1.4 million motorcycles in the entire country (ERIA, 2022). Considering the forecasted gross domestic product and population growth, the number of motorcycles is expected to reach more than 4.2 million units in 2040. Cars will number 1.3 million units, and trucks and buses, 162,000 units (ERIA, 2022).

Most of the country's oil demands are met through imports from Thailand and Viet Nam. In 2019, Lao PDR's share of oil consumption was 29% of total energy consumption, with the country importing 0.92 million tonnes of oil equivalent (Mtoe) to supply the demand for the transport sector and others (Phouthonesy, 2023). Demand is projected to increase 3.56 Mtoe in 2050 in a business-as-usual scenario, comprising the third-highest share relative to coal, electricity, and biomass (Phouthonesy, 2023).

This chapter examines the growth of the transport sector in Lao PDR and its increased energy use. First, it analyses the main drivers of the passenger and mobility demand growth in the country. Second, it presents an overview of the main transport corridors and networks in Lao PDR. Third, it discusses some energy-related issues and current policies implemented by the government. Fourth, it conducts in-depth strength, weakness, opportunity, and threat (SWOT) analyses on electric vehicles (EVs), biofuels for transport, public transport, intercity passenger and freight rail, and logistics and distribution centres in Lao PDR. Finally, it provides proposed policy directions for the country's transport system and market.

## 2. Economic Growth and Mobility Needs

Lao PDR is a landlocked country, bordered by five countries – China to the north, Viet Nam to the east, Cambodia to the south, Thailand to the west, and Myanmar to the north-west. Being a landlocked country makes transport infrastructure key to Lao PDR's economic development. Improved infrastructure can enhance the efficiency of transporting products and people, provide connections between isolated towns and markets, and stimulate investment across several industries. Furthermore, enhanced mobility can facilitate the availability of education and health care, promoting overall socio-economic development and alleviating poverty.

## 2.1. Development Centres

Lao PDR had a population around 7.5 million in 2022.<sup>1</sup> It is organised into 17 *khoueng* (provinces), and 1 *kampheng nakhon* (prefecture). Vientiane, as the capital and largest city, plays a central role in driving economic growth, social progress, and infrastructure development. Pakse serves as the capital of Champasak Province, located in the southern part of the country, and has relatively advanced infrastructure compared to many other cities in Lao PDR. It has well-maintained roads, bridges, and transport networks, facilitating connectivity within the city and with surrounding areas. Luang Prabang, in the north, is a famous UNESCO World Heritage Site celebrated for its architecture, Buddhist temples, and landscapes. In central Lao PDR along the Mekong River, Savannakhet is the second-largest city in Lao PDR and serves as the capital of Savannakhet Province, which is known as a historical and cultural destination for tourists.

Several cities and areas – including Vientiane, Pakse, and Savannakhet – serve as important trading centres due to their strategic locations, economic activities, and connectivity to neighbouring countries. In addition, the Boten Special Economic Zone (SEZ), in the north, is a prominent trading centre facilitating cross-border trade between Lao PDR and China. The SEZ comprises commercial facilities, duty-free stores, and logistics infrastructure, which serve as a magnet for businesses and traders from both countries. The Golden Triangle SEZ, another important trading centre, is located in Bokeo Province, near the borders with Thailand and Myanmar. This SEZ offers opportunities for cross-border trade, investment, and tourism.

## 2.2. Crossing Three Economic Corridors

The Greater Mekong Subregion (GMS) initiative was started as a subregional economic cooperation programme, designed to enhance economic relations amongst various countries. The GMS was formed in 1992 and comprises Cambodia, China (including Yunnan Province and Guangxi Zhuang Autonomous Region), Lao PDR, Myanmar, Thailand, and Viet Nam (ADB, 2015a). Only a small portion (14%) of existing GMS lines pass through Lao PDR (Frielink and Bando, 2018). Yet Lao PDR is strategically situated at the intersection of three of its significant economic corridors:

- (i) **North–South Economic Corridor.** This corridor is key to facilitating the access of Yunnan Province – and the northern portion of Lao PDR – to seaports. This corridor serves as a transport route linking the cities of Kunming in China and Bangkok in Thailand, while passing through Lao PDR. The portion that traverses Lao PDR spans a distance of 1,434 kilometres (km) (12%).
- (ii) **East–West Economic Corridor.** Spanning from Da Nang in Viet Nam to Mawlamyine in Myanmar, with a route that traverses Lao PDR, this corridor serves as a conduit for trade and transport within the GMS.

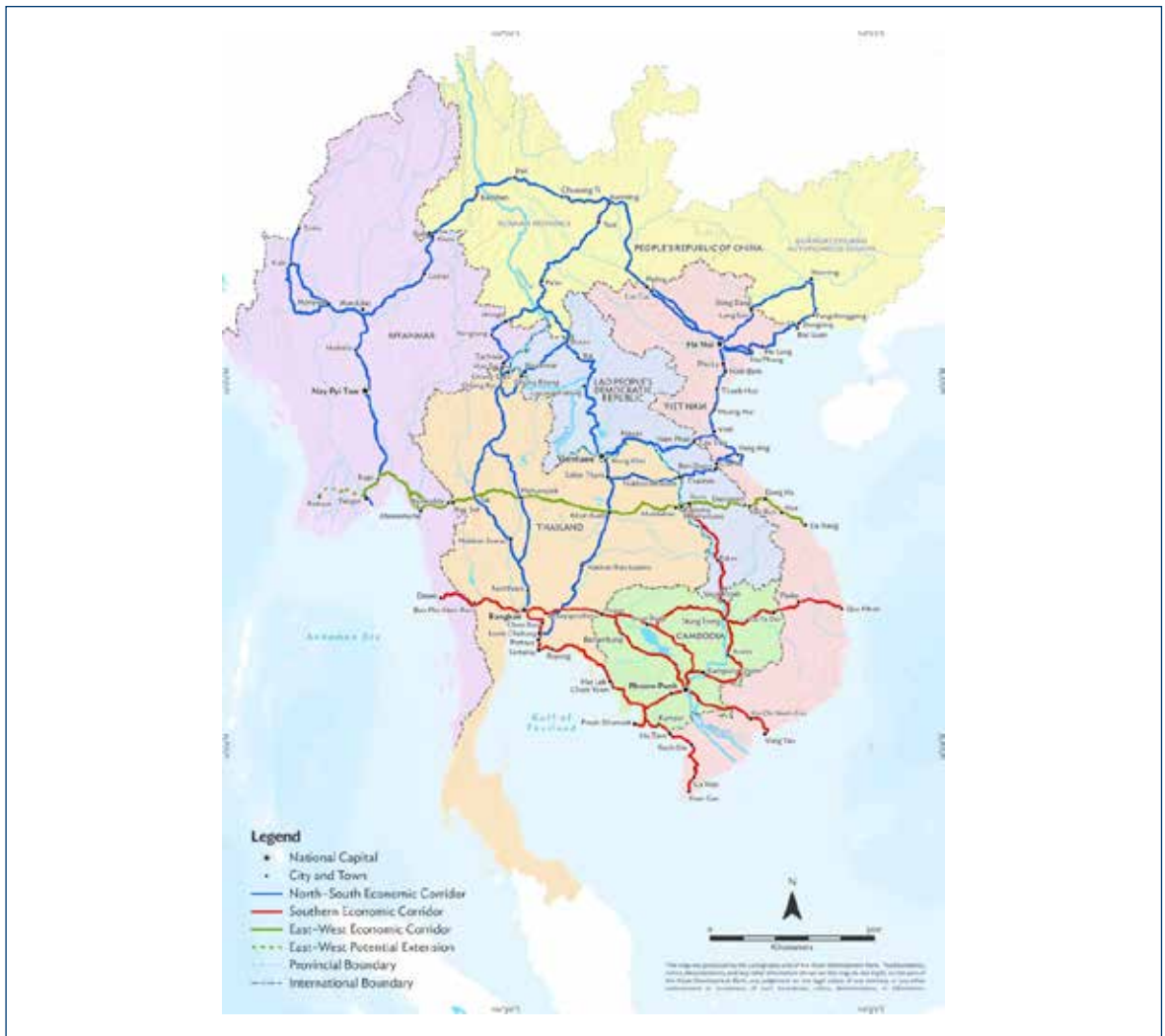
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<sup>1</sup> World Bank, Lao PDR – Population Total, <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=LA> [accessed 28 April 2024]

(iii) **Southern Economic Corridor.** This corridor connects Cambodia with six provinces in Thailand (including Bangkok), four regions in Viet Nam (including Ho Chi Minh City), and six provinces in Lao PDR. It also extends to Dawei in Myanmar (Figure 4.1).<sup>2</sup>

These corridors are essential for fostering economic growth, regional integration, and connectivity for Lao PDR and its surrounding countries. They enhance the flow of products, services, investment, and people, promoting socio-economic development.

**Figure 4.1. Main Economic Corridors in the Greater Mekong Subregion**



Source: GMS, Economic Corridors in the Greater Mekong Subregion, <https://greatermekong.org/g/economic-corridors-greater-mekong-subregion>

<sup>2</sup> GMS, Economic Corridors in the Greater Mekong Subregion, <https://greatermekong.org/g/economic-corridors-greater-mekong-subregion>

*The GMS Economic Cooperation Program Strategic Framework 2030* is implementing a strategy consisting of three main components – connectivity, competitiveness, and community – known as the 3Cs (ADB, 2021). First, the programme aims to enhance connectivity by focussing on sustainable development of physical infrastructure and transforming the transport corridors into transnational economic corridors. Second, it seeks to improve competitiveness by efficiently facilitating the movement of people and goods across borders and integrating markets, production processes, and value chains. Lastly, the programme aims to foster a stronger sense of community by implementing projects and programmes that address shared social and environmental issues (Frielink and Bando, 2018).

## 2.3. Freight Transport Demand

The Ministry of Public Works and Transport (MPWT) in Lao PDR is responsible for the development and upkeep of the transport infrastructure at the national level (ADB, 2010). A study by GIZ (2014) on Lao PDR's transport and logistics industry highlighted that Lao PDR enterprises have a relatively limited range of value-added services available for the agricultural, manufacturing, and trading sectors to import and export freight. Table 4.1 explains the situation of sector-based freight demand in Lao-PDR.

**Table 4.1. Sectoral-based Freight Transport Demand in Lao PDR**

Sector	Details	Source
Forestry	<ul style="list-style-type: none"> <li>International freight transport is limited to Viet Nam and focusses on timber and minerals.</li> <li>Timber is exported from the southern provinces using trucks.</li> </ul>	GIZ (2014)
Agriculture	<ul style="list-style-type: none"> <li>Food is distributed and agricultural production is delivered to markets by producers using their own transport or smaller local haulers.</li> <li>Inter-city trucks deliver beer, coffee, sugar, and candy.</li> <li>From January to August 2023, Lao PDR–China Railway transported 3,101,400 tonnes of goods, including fruits, cassava flour, barley, rubber, beer, iron ore, rock, and chemical fertilisers.</li> </ul>	GIZ (2014), Xinhua (2023)
Mining	<ul style="list-style-type: none"> <li>Thai trucks bring copper and gold exports to Thai ports. A Lao PDR forwarder won the Sepon Copper mining contract, but the 25 vehicles in this fleet are the same Thai trucks and drivers that manage shipment. Trucks from Viet Nam or Lao PDR deliver massive amounts of copper ore to Viet Nam ports. The miners are unhappy with Lao PDR trucks available, however, since they do not match requirements, mostly because Lao PDR operators will not invest in the right equipment.</li> <li>Products primarily carried to Viet Nam from Lao PDR include gypsum, limestone, iron ore, potassium, and lignite. The majority is transported from mines and quarries located in Khammouane Province, as well as from Vientiane Province.</li> <li>Limestone must go to cement mills in Nakhon Phanom, Thailand. Over the past 8 years, significant Lao PDR operators have emerged to handle the majority of this traffic previously controlled by Vietnamese trucking operators.</li> </ul>	GIZ (2014)

Source: Authors.

ADB (2010) reported that overall demand for transport infrastructure is minimal, as the traffic volume on the national network (excluding areas surrounding Vientiane and Savannakhet) is below 1,000 units of average annual daily traffic, and below 500 on most other networks. Nevertheless, there has been a consistent annual increase in demand for commodities at a pace of 5%–8% and for passengers at a rate of 8%–10% (ADB, 2010).

In 2018, 11,894 companies were operating in road freight transport across the entire country, based on company registration data from the Ministry of Industry and Commerce (World Bank, 2018). In the current domestic market, the freight demand is quite low. Buses have limited capacity to meet the demand for transporting goods, although they are often used for delivering time-sensitive cargo weighing 100 kilograms or less (World Bank, 2018). Instead of using semi-trailers to transport containers and cargo on a single vehicle, the trucking industry – along with Lao International Truckers and Freight Forwarders Association (LITFA) – still prefers a transshipment model, involving transferring all cargo at the border onto Lao PDR trucks.

International freight transport routes are predominantly restricted to Viet Nam and are primarily for lumber and minerals. The import and export freight industry heavily relies on foreign trucks, primarily from Thailand, Viet Nam, and China. In contrast, the presence of Lao PDR vehicles in the international freight transit market is minimal (GIZ, 2014).

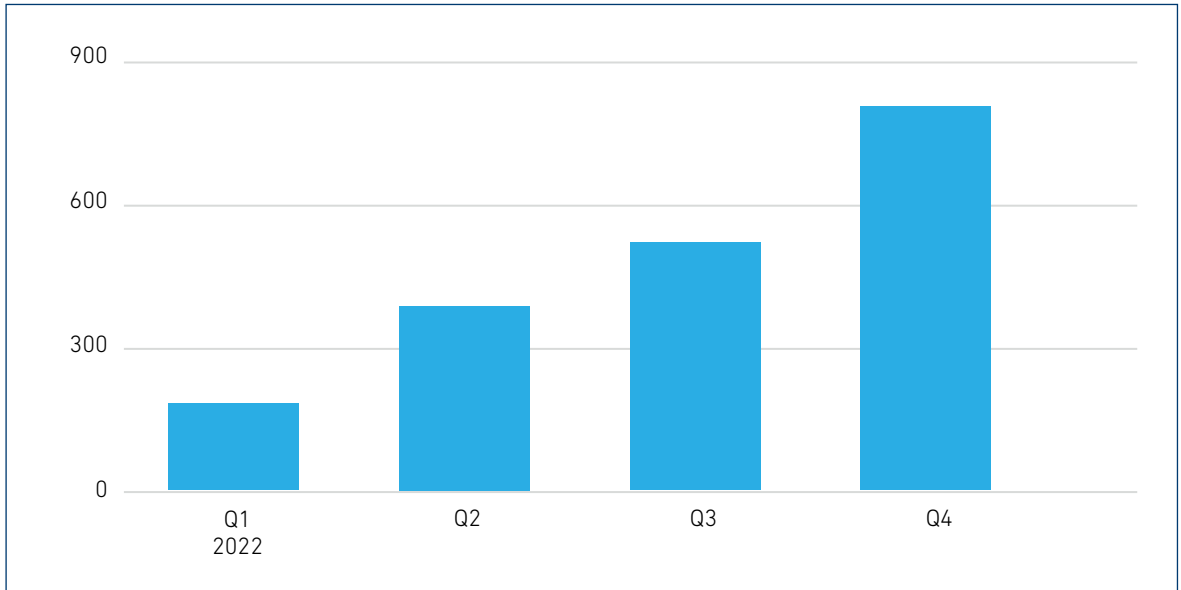
LITFA serves as the official representation body for express, freight, and logistics firms in Lao PDR. It has been actively involved in the National Transport Committee and National Trade Facilitation Committee, which is working to transform Lao PDR from a landlocked country, which historically has been perceived as disadvantage, to a 'land-linked' one, which focusses on road infrastructure and trade connectivity (UNESCAP, 2011).<sup>3</sup>

The LCR is projected to experience consistent growth in transporting freight, with an estimated 1.9 million tonnes of cargo being transported in 2022, as shown in Figure 4.2 (Allen and Leuangkhamsing, 2023). As of March 2024, the LCR has transported a total of 34.24 million tonnes of freight (*The Nation*, 2024).

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<sup>3</sup> LITFA, <https://litfa.org/#/about>

**Figure 4.2. Cargo Transported through Lao PDR, 2022**  
(‘000 tonnes)



Q = quarter.

Sources: Laos-China Railway Company; Asian Development Bank estimates (2023).

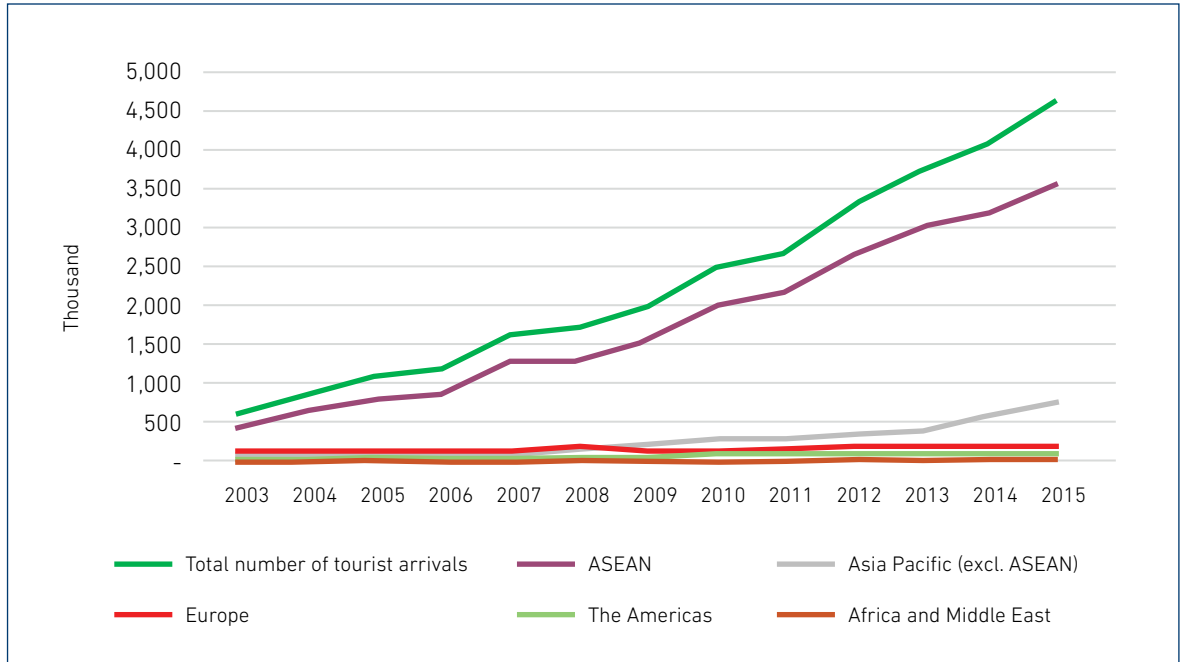
## 2.4. Passenger Transport Demand

As the population of Lao PDR continues to expand, there is an inherent rise in the need for passenger transport services. Indeed, urban passenger transport demand is projected to double between 2015 and 2050 (ITF, 2021). With the growing urban population and their economic participation, transport is necessary to facilitate access to employment, education, health care, and various other services.

With the growth and increased population density of cities, there is also an escalating demand for public transport services, such as buses, to enhance mobility. The implementation of a bus rapid transit (BRT) plan in Vientiane is expected to result in a 6% increase in the use of public transport. The BRT is expected to accommodate 30,000 passenger rides per day by 2030 (UNESCAP, 2011).

The expansion of the tourism sector also stimulates the need for passenger transport services, including air travel, long-haul buses, and river cruises, to convey both local and global tourists to various destinations. The tourist sector in Lao PDR is experiencing an average yearly growth rate of 19.6% (World Bank, 2023). It has seen a rise in tourist arrivals from all regions in the world (Figure 4.3). In 2019, over 4.8 million tourists travelled from Association of Southeast Asian Nations (ASEAN) countries, as well as Australia, Canada, China, the European Union, Republic of Korea, New Zealand, and United States (World Bank, 2023).

**Figure 4.3. Tourist Arrivals in Lao PDR, 2003–2015**  
(‘000)



ASEAN = Association of Southeast Asian Nations.

Source: ERIA (2017).

Since its commencement in December 2021, the LCR has facilitated more than 30 million passengers, and its passenger volume is steadily increasing (*Global Times*, 2024). Lao PDR segment significantly increased the number of daily passenger trains from 4 to 12, resulting in a peak daily passenger throughput of 12,808, a significant increase over the previous 720 (*Global Times*, 2024).



## 3. Supply Side: Transport Corridors and Networks

Although transport demand in Lao PDR has significantly risen – growing annually at approximately 20% to support an overall economic growth rate of around 6% per year – the road network still predominantly handles transport needs, accommodating 90% of freight and 80% of passenger traffic (Nhansana, 2017). River transport serves a smaller portion, around 6% of local freight tonne-km and 15% of passenger-km (Nhansana, 2017). Despite its relatively modest volume, air transport is expanding and serves a vital role in connecting urban centres and remote regions.

### 3.1. Rail Corridors and Networks

The LCR has the potential to significantly transform the economic geography and logistics environment of Lao PDR. Construction commenced in 2016, and its inauguration took place in 2021 as part of the government's plan to establish itself as a regional logistics hub. It was also a strategic effort to enhance Lao PDR's involvement in China's Belt and Road Initiative (Kuik and Rosli, 2023). The LCR runs 409 km through Lao PDR, stretching from the Chinese border near Boten to Vientiane near the Thai border (Figure 4.4).

The LCR has a single track with a standard gauge of 1.435 metres. This track uses an electrified mixed-traffic line built according to China's GB Grade 1 standard. The line is suitable for passenger trains travelling at speeds of up to 160 km/hour and freight trains traveling at speeds of up to 120 km/hour. The 554.72-km railway project necessitated a total investment of US\$5 billion (*Saigon News*, 2018).

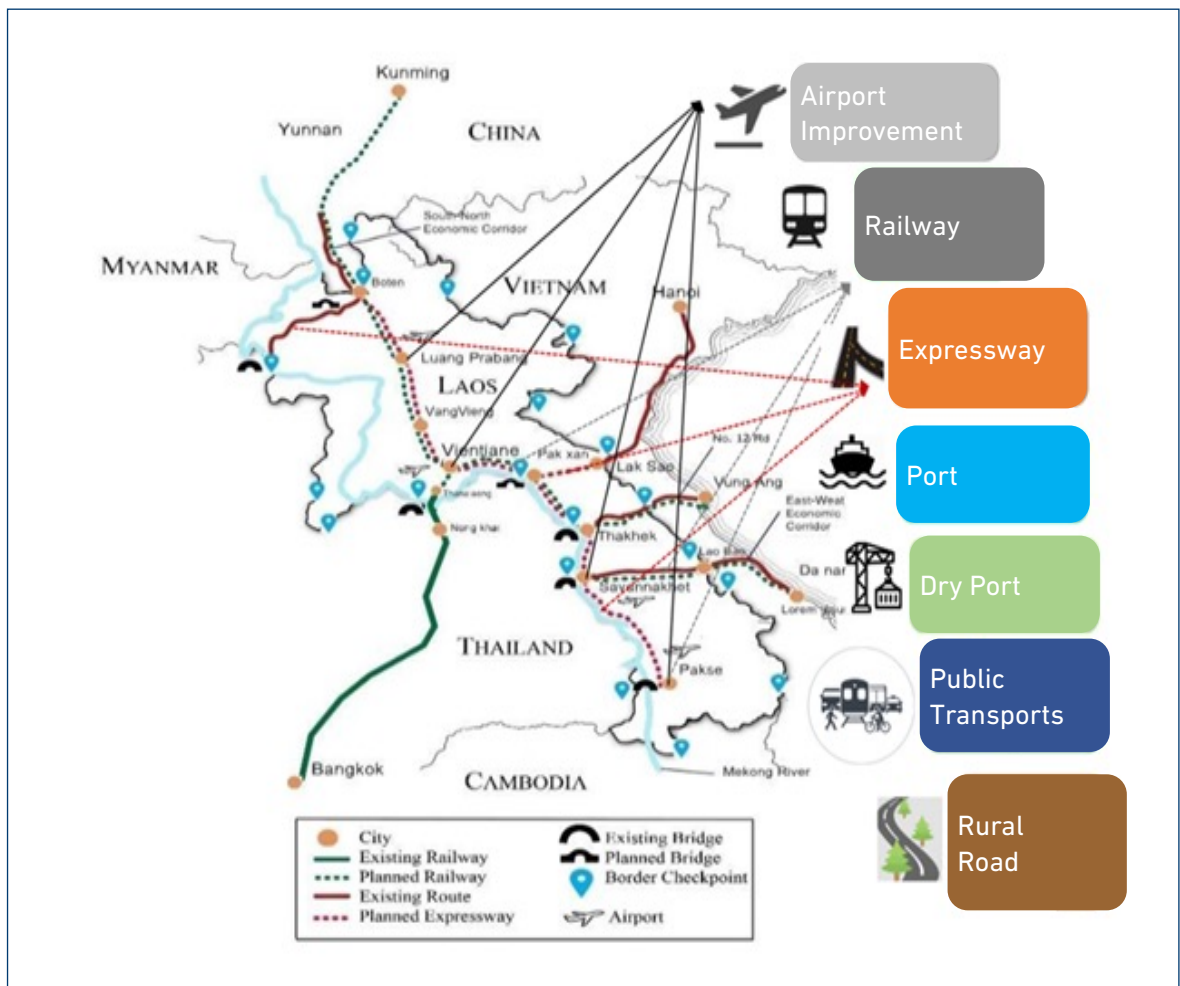
Figure 4.4. Lao PDR–China Railway Route



Source: Vietasia Travel (2022).

According to Sayavong (2018), the sole rail infrastructure in operation between Thailand and Lao PDR is currently a 3.5-km extension originating from Thailand, spanning from Nong Khai and crossing the Friendship Bridge to reach Thanaleng Railway Station, about 20 km east of Vientiane. The project's entire investment amounted to approximately US\$6 billion. Thai and Lao PDR officials have been engaged in discussions regarding the enhancement of transport, commercial, and interpersonal connections along the Thailand–Lao PDR border (Kuik and Rosli, 2023). Figure 4.5 shows the railway (and other transport mode infrastructure) planned by the Government of Lao PDR.

**Figure 4.5. Lao PDR Railway Planning**



Source: Sayavong (2018) and Kattignasack (2022).

Lao PDR and Viet Nam have signed a memorandum of understanding for a rail project connecting Vientiane and Vung Ang (ERIA, 2016). Additionally, the concept encompasses the creation of a highway connecting Ha Noi and Vientiane. Approximately US\$1.5 billion would be sourced from the Vietnamese State Budget for this project. The timetable for its construction has not yet been disclosed.

## 3.2. Airport Infrastructure

Lao PDR now operates seven domestic airports and four international airports. Collectively, they manage approximately 2% of the overall transport volume (Sayavong, 2018). Wattay International Airport in Vientiane and Luang Prabang International Airport manage international air traffic and offer associated customs, immigration, and quarantine services.<sup>4</sup>

Airport capacity and the frequency of international flights have both grown and improved throughout the years. There was a 152% rise in air travel to and from Lao PDR in 2017, with over 2 million people making the trip (Sayavong, 2018). An even more important development is the ongoing expansion of Wattay International Airport in Vientiane, which will allow the airport to process more than 400 passengers per hour and accommodate Boeing 747 aircraft with 350 seats (Sayavong, 2018). Three domestic airports in Lao PDR have also recently undergone upgrades: Luang Prabang in the north, Savannakhet in the centre, and Pakse in the south. The airports in Luang Prabang and Pakse, in particular, are capable of handling planes the size of the Airbus A300, leading to a 21% annual rise in the number of passenger flights between 2010 and 2014.

In 2024, the government stated its intention to transform Nong Khang Airport in Houaphanh Province into an international airport. The facility was formerly financed and constructed by the Government of Viet Nam. The new build–transfer project will be implemented with a total investment of US\$82 million, funded by a loan provided by Hoang Anh Gia Lai Agriculture JSC, a company based in Viet Nam. The runway will be extended by 3 km to accommodate larger planes. The airport upgrade is in accordance with the national development goals of the MPWT and the Department of Civil Aviation (Southeast Asia Infrastructure, 2024).

## 3.3. Inland Waterways

Inland waterway transport in Lao PDR occurs principally on the Mekong River, with 1,865 km that are navigable of the total 4,350 km that cross the country. Most traffic is concentrated between Vientiane and Sainyabuli in the north-west, approximately 400 km apart. The main products transported are sand, building stones, and wood. Barges are also used to transport timber from the northern provinces to sawmills around Luang Prabang and Vientiane (Banomyong and Pholsena, 2004).

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<sup>4</sup> After 3 years of construction, a newly built international airport – Bokeo International Airport – was formally opened in February 2024 by Bokeo Province and Golden Triangle Special Economic Zone. It is the third largest airport in Lao PDR, with the capacity to accommodate around 2 million people annually (Lao News Agency, 2024).

There are 29 existing inland waterway ports along the Mekong River (MPWT, 2020). These ports are used to load and unload goods consumed locally as well as to be transported between Thailand and Lao PDR. During the rainy season, the river provides an alternative to road transport along the country's western border and in the northern region. Depending on the stretches, 60–200-tonne ships can navigate the northern section of the Mekong River (i.e. from Savannakhet port to the north) year-round. The southern stretches are, in general, navigable by smaller vessels and for more limited periods of the year. During the dry season, most of the southern stretches are only navigable by light boats, which limits the development of river transport there.

In 2000, an agreement on commercial navigation on the Mekong River was signed amongst China, Myanmar, Lao PDR, and Thailand to facilitate navigation on the upper part of the Mekong River. It provides navigation aids, improvements to river ports, and offers solutions to integrate the river network into the regional road network. However, Lao PDR risks hardly benefiting from it – unlike China and Thailand – as only a small part of the goods transported on the river is intended for Lao PDR market (Banomyong and Pholsena, 2004). It is also difficult to envisage Lao PDR exporting by river, because the industrial centre of the country is in Vientiane, where goods are exported by truck to the port of Bangkok. The only advantage that Lao PDR can derive from this agreement in the medium term lies in the promotion of tourist sites and cruises along the Mekong River.

Indeed, the Mekong River Commission conducted a 2040 forecast study on inland waterway traffic and concluded that relatively strong cargo traffic growth would be achieved in Cambodia, Thailand, and Viet Nam – but not Lao PDR (MRC, 2015). Inland waterway cargo traffic growth in Lao PDR is restricted by boats, poor port infrastructure, and competition from road transport, which has benefitted from improved highway infrastructure. However, investments targeting increasing inland waterway infrastructure and cargo vessel capacity from the current 100 deadweight tonnes (DWT) to 500 DWT will reduce inland waterway transport operating costs and increase competitiveness and the share relative to road transport.

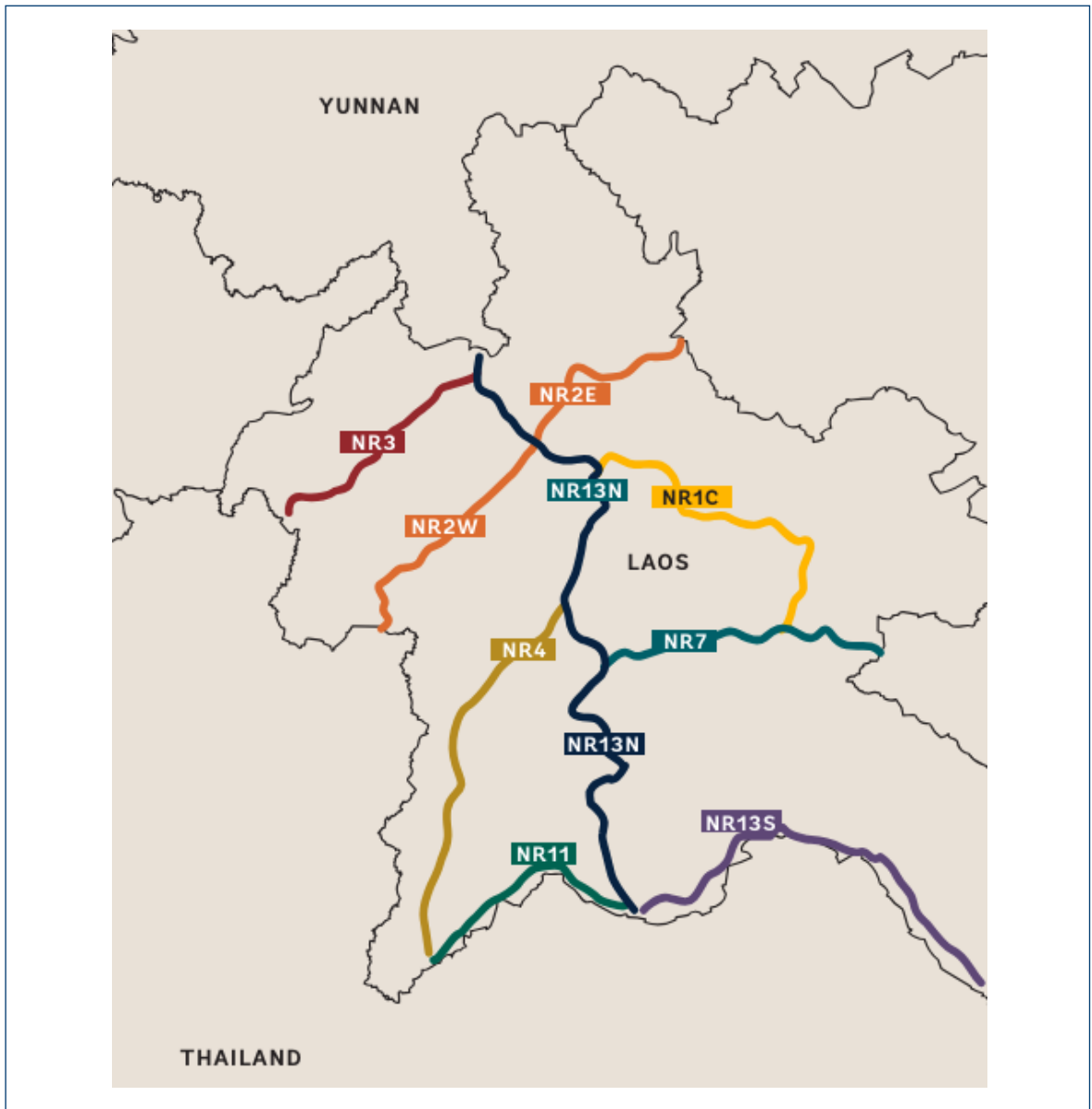
The study also pointed out how the tourist potential of the Mekong River has yet to be fully realised in Lao PDR, owing to a poor safety record and comfort of passenger boats, particularly between Huay Xai and Luang Prabang. Significant improvements to onboard safety and to landing facilities are expected to allow inland waterway tourist traffic to grow at rates approaching the growth in overall tourist arrivals in Lao PDR, around 16% per year (MRC, 2015).

### 3.4. Road Corridors and Networks

The use of inland waterway transport has decreased since the opening of the First Thai–Lao Friendship Bridge in 1994 that connects Nong Khai, Thailand with Vientiane. In 2006, the Second Thai–Lao Friendship Bridge (Mukdahan–Savannakhet) opened, which is a part of the East–West Economic Corridor route that starts from Myanmar, passes through Thailand and Lao PDR, and ends in Viet Nam.

National Road (NR) 13 is the most important highway in the country, connecting Boten, Luang Prabang, Vang Vieng, Vientiane, Savannakhet, Pakse, and Veun Kham, following the Mekong River. The route consists of two sections: NR13 North, spanning 671 km from Vientiane to Boten, and NR13 South, spanning 829 km from Vientiane to the Cambodian border. The primary segments of the road were constructed in 1997 with an axle load capacity of 8.2 tonnes, which is lower than the regional norm of 11.0 tonnes. It has not undergone any rehabilitation since their completion (World Bank, 2020).

**Figure 4.6. Lao PDR Key Road Corridors**



Source: World Bank (2020).

As shown in Figure 4.6, the road corridors and network in Lao PDR consist of:

- (i) **Chinese–Thai Corridor.** NR3 connects Thailand and China via Bokeo and Luang Namtha in Lao PDR. Due to increased transit traffic and flood frequency, the route requires upgrading.
- (ii) **Thailand–Lao PDR–Viet Nam Corridor.** NR2 (NR2W, 187 km; NR2E, 166 km) links Thailand and Viet Nam via Oudomxay. Both NR2W and NR2E, built in 2000, are in bad condition.
- (iii) **Luang Prabang.** The main route to Sainyabuli and Nan provinces in Thailand is NR4A. NR1C links Luang Prabang to Nong Khiaw and Houaphanh Province, which are tourism destinations. Luang Prabang is connected to Xiangkhouang and Vang Vieng via NR7 and NR13.
- (iv) **Vientiane surrounds.** NR11 links four southern Sainyabuli districts to Vientiane. The first 56 km of road were rebuilt to asphalt concrete in 2012, and the remaining route is being built with support from the Government of Thailand, with completion scheduled by 2023. To encourage tourism and agribusiness in Vientiane Province, officials must repair these provincial roadways.
- (v) **Vientiane capital.** The Vientiane Railway Station is the primary passenger station of the LCR, located 9 km from the city centre, and the MPWT must enhance urban mobility near the station to reduce traffic congestion.
- (vi) **Beyond Vientiane.** Bolikhamsai and Khammouane provinces are 140 km and 350 km from Vientiane, respectively. NR13S connects this area, with potential for transporting rice and other agricultural products via rail.

## 3.5. Evolution of Road Transport Modes

In 2016, motorbikes accounted for 76.9% of the vehicle stock in Lao PDR, cars accounted for 20.0%, trucks accounted for 2.8%, and buses accounted for 0.3% (ERIA, 2022). In 2016, the road vehicle fleet consisted of 80% gasoline-fuelled cars and 20% diesel-fuelled vehicles. From 2000 to 2016, the number of road vehicles in Lao PDR increased significantly at an average annual rate of 15%. Amongst the many types of vehicles, diesel vans experienced the highest annual growth rate of 21.4%, followed by diesel pick-up trucks with an average annual growth rate of 18.4% (ERIA, 2022).

**Table 4.2. Road Vehicle Stock Data from Lao PDR**

Fuel Type	Gasoline			Diesel				
Vehicle Category	Motorbike		Car				Truck	Bus
Vehicle Type	Two-wheeler	Three-wheeler	Sedan	Pickup	Van	Jeep		
<b>2000</b>	153,781	4,347	8,045	15,074	2,199	3,970	8,424	1,831
<b>2001</b>	168,379	4,405	8,995	17,581	2,603	4,355	10,559	1,899
<b>2002</b>	195,353	4,405	9,428	19,042	2,691	4,584	11,346	2,042
<b>2003</b>	196,963	6,407	9,696	25,490	2,729	5,832	11,841	2,164
<b>2004</b>	285,740	7,871	10,063	38,214	3,777	6,949	13,085	2,179

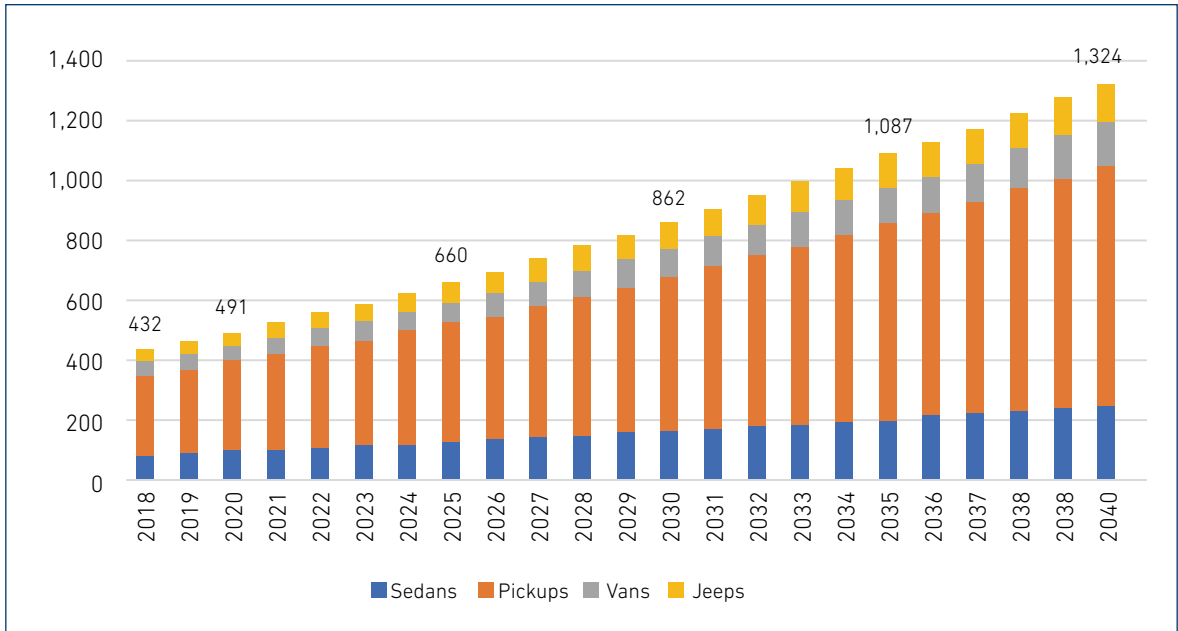
Fuel Type	Gasoline			Diesel				
Vehicle Category	Motorbike		Car				Truck	Bus
Vehicle Type	Two-wheeler	Three-wheeler	Sedan	Pickup	Van	Jeep		
<b>2005</b>	337,719	8,043	11,204	45,029	4,862	7,909	13,441	2,199
<b>2006</b>	453,158	8,441	12,939	60,352	7,236	8,668	15,296	2,200
<b>2007</b>	509,421	8,518	14,792	68,360	10,355	9,399	17,994	2,242
<b>2008</b>	623,310	8,460	15,203	77,616	12,675	9,752	19,070	2,520
<b>2009</b>	711,800	8,624	17,671	93,080	18,634	10,801	23,031	2,707
<b>2010</b>	804,087	8,542	21,638	109,362	24,727	12,155	25,542	2,852
<b>2011</b>	899,685	8,554	28,096	128,892	32,667	14,169	28,873	3,203
<b>2012</b>	1,005,047	8,588	35,514	147,497	37,831	17,231	33,460	3,532
<b>2013</b>	1,112,072	8,601	43,860	162,633	50,124	19,876	38,454	3,861
<b>2014</b>	1,218,379	8,737	51,284	185,086	42,770	22,515	44,293	4,120
<b>2015</b>	1,318,107	8,761	58,871	204,360	47,553	26,665	48,739	4,448
<b>2016</b>	1,413,990	8,879	65,699	225,060	49,061	30,223	52,443	4,665

Source: ERIA (2022).

Lao PDR has seen a significant increase in each road transport mode over the few past decades. As a landlocked country, the rapid motorisation in road transport is significantly correlated with growing economic activities. ERIA (2022) projected the number of road transport vehicles for each mode up to 2040 based on 2016 vehicle stock data. The projections were done assuming that the share of each mode would remain constant throughout 2018–2040. The results are shown in Figures 4.7, 4.8, and 4.9.

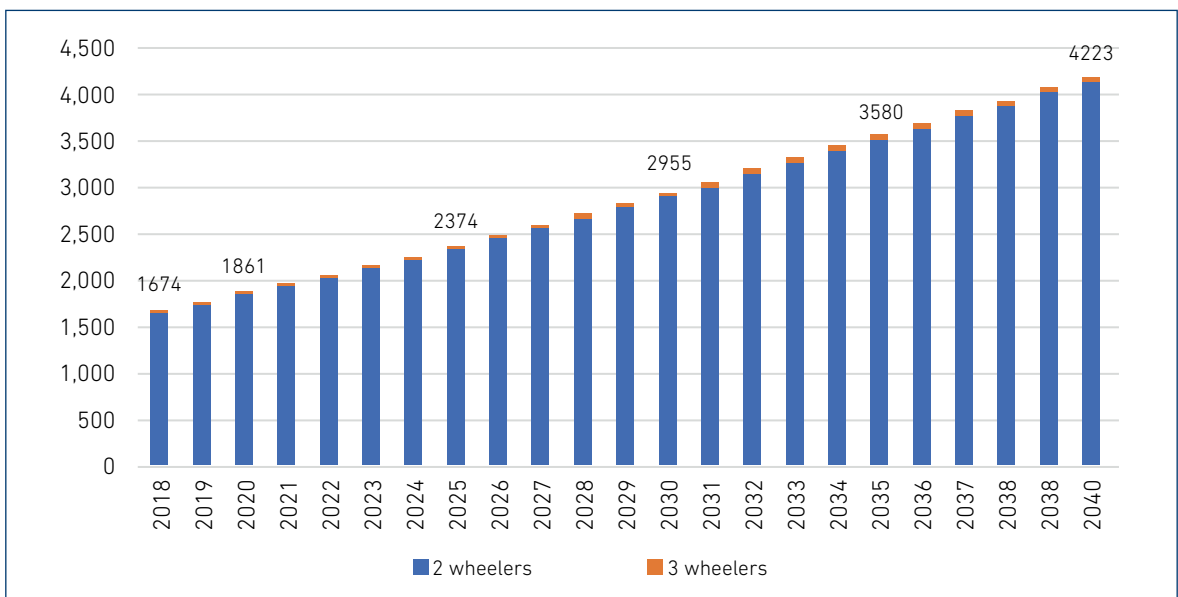


**Figure 4.7. Total Number of Cars in Lao PDR, 2018–2040**  
(‘000 units)



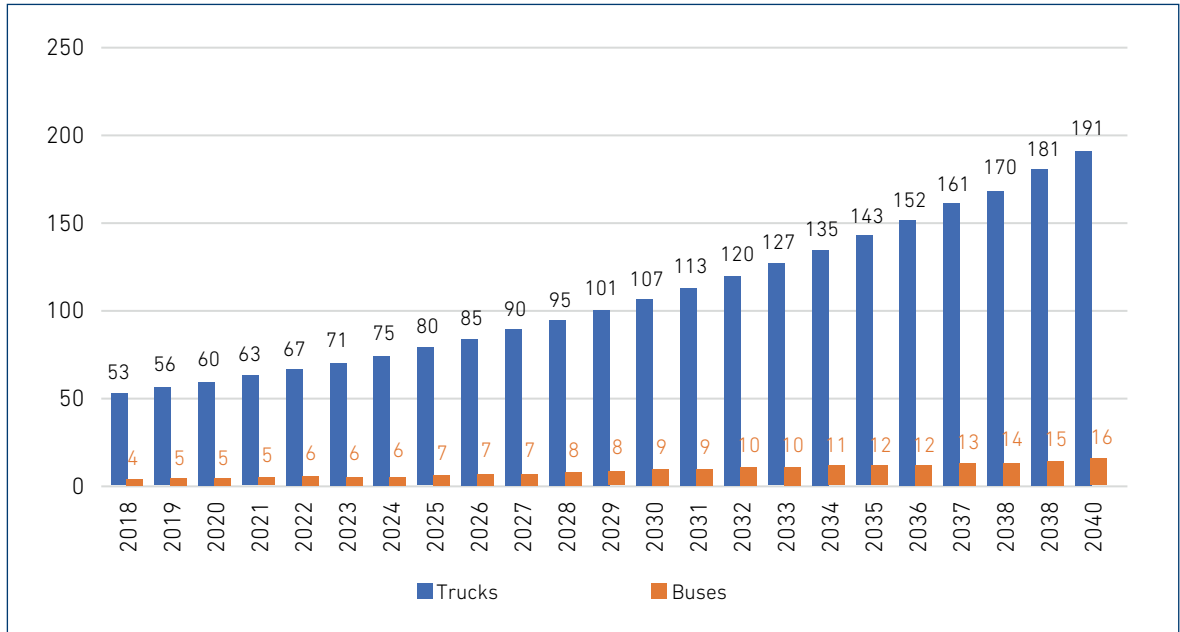
Source: ERIA (2022).

**Figure 4.8. Total Number of Motorcycles in Lao PDR, 2018–2040**  
(‘000 units)



Source: ERIA (2022).

**Figure 4.9. Total Number of Trucks and Buses in Lao PDR, 2018–2040**  
(‘000 units)



Source: ERIA (2022).

Based on the projection results, it is expected that cars will grow the fastest, with an annual growth rate of 6.0% up to 2025 then 4.0% until 2040. Motorcycles will still dominate the share of vehicles with 4,223,000 vehicles in 2040. This growth will be slower at 5.0% per year until 2025, and then 3.4% until 2040. Trucks and buses together will have the slowest growth at 4.4% per year up to 2025, and then 3.6% until 2040.

## 4. Strengths, Weaknesses, Opportunities, and Threats Analyses

### 4.1. Background

Given Lao PDR's landlocked geography and lack of direct access to seaports, road transport serves as the primary mode of transport for both domestic and international trade. Although road networks are crucial for establishing connections and promoting economic growth, excessive dependence on this form of transport can result in several challenges such as congestion, deterioration of infrastructure, and inefficiencies within the transport system. Moreover, the use of fossil fuels for transport is substantial. The vehicles used in Lao PDR for road transport, including trucks, buses, cars, motorcycles, and tuk-tuks, are predominantly fuelled by gasoline or diesel.

The country's reliance on imported fossil fuels leaves it susceptible to variations in global oil prices and exposes it to dangers related to energy security and disruptions in supply. Therefore, implementing technological innovations and transitioning to alternative fuel sources are essential.

Lao PDR is currently making efforts to decrease emissions in its transport sector. This includes targeting boosting the adoption of two-wheeled and passenger EVs by 30% by 2050; restructuring the country's urban public transport system, particularly in Vientiane; and transitioning 10% of transport fuels to biofuels (SMMR, 2022). These programmes aim to decrease emissions by 29,000–30,000 tonnes of carbon dioxide equivalent (tCO<sub>2e</sub>) per year (KNUT and Youngin ITS, 2023). Moreover, the country also has the goal to reduce gasoline and diesel imports by 10% by promoting the production of ethanol and biodiesel (KNUT and Youngin ITS, 2023).

The government has enacted policies to support those targets. The draft national power development plan presents a promising pathway to decrease fuel imports and to reduce emissions by promoting the use of EVs in the transport industry. Moreover, the *9th Five-Year National Socio-Economic Development Plan (2021–2025)* encourages the adoption of vehicles running on clean or locally sourced energy. In December 2022, the Global Green Growth Institute released a document on EVs in Lao PDR (GGGI, 2022).

Furthermore, to decrease its significant reliance on road transport, Lao PDR should encourage a transition to rail transport with the implementation of the LCR. Approximately 40% of maritime freight traffic between ASEAN Member States and China could be redirected to the LCR, while around 54% of land freight traffic between Lao PDR and China could also be shifted to the LCR (World Bank, 2020).

The issue of inequality is also related to the transport sector. Purwanto (2004), for example, synthesised the role of transport as Rawlsian primary goods that allow the free movement of people and goods. Focussing on the movement of people, Wenglenski (2004) described how the inability to move may signify the inability to find a job. Transport in terms of basic mobility can be considered, therefore, as amongst the most important rights that allow people to access basic services such as jobs, health care, and education.

Jouffe et al. (2015) indicated that mobility inequalities are often interpreted in terms of a lack, which is based on the assumption of the lower mobility capacity of the poor and the domination of the rich. The functioning of the housing market often forces the least well-off people to be in the worst position in terms of optimisation between their geographical position for services (i.e. working, education, health care, and social activities) and their affordable and habitable housing space. This spatial configuration of places of residence and employment (and other services) is likely to produce longer potential home-to-work and other home-to-services distances for lower-income social categories.

Moreover, a greater constraint on physical access to employment and other services for lower-income categories can be related to their lower degree of access to the most efficient modes of transport for a given trip (Dupuy, 1995). Travel has an unequal time and monetary cost depending on the mode used. Cars are both the quickest and most expensive and have the ability to reach many destinations quickly. They also represent a monetary cost, which can limit access and use for the less well-off categories. Public transport facilities and networks are, in general, more developed in urban centres and less on the peripheries, which contain more affordable living spaces for the low-income population.

The issue of inequality related to the transport sector – apart from the spatial configuration – must thus be considered as well as the differences in access to modern transport modes that provide affordable and sustainable ways of moving to reach different destinations related to life needs. Transport affects inequality to main public services.

Lao PDR is still one of the least-developed countries in the world – and in ASEAN – due to its low-income level, poor condition of human assets, and high economic vulnerability. According to the ASEAN Secretariat (2022), Lao PDR's gross domestic product per capita is the third lowest in ASEAN, just above Myanmar and Cambodia. Warr, Rasphone, and Menon (2015) revealed how inequality in access to public services in Lao PDR – especially to lower primary and secondary schooling and to primary health care services – decreased between 1997 and 2013. Yet the World Bank (2024) reported that long inflation has increased problems accessing such public services due to several issues including lengthy processes, understaffing, and difficulty in travelling to government offices.

As a South-east Asian country that has experienced fast urbanisation, Lao PDR sees this sort of inequality often in its main urban area, Vientiane (UN, 2018). Vongpraseuth, Song, and Choi (2022) detailed several inequality issues in Vientiane, as there are different levels of access to transport facilities and modes. Low-income commuters are most likely motorbike users; automobile dependency is concentrated in the city centres, with low-income groups bearing the transport cost burdens related to urban sprawl and experiencing poorer urban networks and infrastructure.

JICA and MPWT (2010) stressed three points:

- (i) a public transport system, when introduced, should be focussed on low-income people, connecting suburban areas and urban centres;
- (ii) as the operating costs of EVs are cheaper than those of internal combustion engine vehicles, EVs should be introduced to the low-income areas to improve their mobility together with a proper government policy; and
- (iii) considering the low income of and low motorisation in Lao PDR, subsidising public transport would serve many.

Increasing the equality of the transport system in Lao PDR should aim to equalise the capability of transport users to move in the most energy-efficient and economical ways by using modern transport services and infrastructure to execute their daily activities and to achieve their daily needs. Thus, inequality should be amongst the topics surrounding the country's transport sector, which is closely related to the issue of people's access to modern energy services as well.

Against the background of Lao PDR's economic growth, demand for mobility, and development of the supply side (i.e. transport modes, infrastructure, and systems), the following presents SWOT analyses of various aspects of the transport sector: EVs, biofuels for transport, public transport in urban areas, intercity passenger and freight rail transport, and logistics and distribution centres.

## 4.2. Electric Vehicles

EV penetration in Lao PDR underwent a SWOT analysis, supported by JICA and MPWT (2010).

**Table 4.3. SWOT Analysis of Electric Vehicle Adoption in Lao PDR**

	Current	Future	
<b>Strengths</b>	<ul style="list-style-type: none"> <li>• Vast amount of green electric supply (from hydropower)</li> <li>• Innate capability to adapt imported technology to meet its mobility needs</li> <li>• Strong international support for the development of the road network and connectivity</li> </ul>	<ul style="list-style-type: none"> <li>• Bigger emissions reduction opportunity utilising green electric supply from hydropower</li> <li>• EV development results in reduced reliance on petroleum product importation.</li> <li>• EV costs lower than internal combustion engines</li> <li>• Lessons from neighbouring EV front-runner countries</li> <li>• Close proximity and connectivity with China, an EV manufacturer powerhouse</li> </ul>	<b>Opportunities</b>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>• Slower economic growth compared to pre-pandemic</li> <li>• Underdeveloped and unpaved road networks and facilities</li> <li>• Limited development budget and technical resources</li> <li>• Lack of EV-charging and other infrastructure</li> <li>• Mountainous terrain, landlocked geography, and poor road network susceptible to disasters</li> </ul>	<ul style="list-style-type: none"> <li>• Electricity export versus supply for powering EVs</li> <li>• Policy gaps in the existing EV regulations</li> <li>• Rapid motorisation without a good public transport system would cause severe and costly traffic congestion in urban areas.</li> </ul>	<b>Threats</b>

EV = electric vehicle.

Source: JICA and MPWT (2010).

Lao PDR's strength is its abundant supply of green energy, which comes from hydropower. As a landlocked country, Lao PDR relies heavily on road transport, which is mostly dominated by internal combustion engine vehicles. When EVs are introduced, however, reliance on petroleum can be lowered. Further, higher unabated petroleum prices may also increase the shift to EVs due to more economically feasible costs.

Strong international support – combined with the country's high adaptability towards technology – can be beneficial in increasing the EV share. Building connections and collaboration with neighbouring countries can accelerate EV adoption as well as improve the development of the EV industry within the country. Policy gaps, however, need to be addressed from existing regulations to reduce uncertainty and to promote investment. As a neighbour to China – an EV manufacturer powerhouse – Lao PDR can also benefit from its mature technology and industry, which additionally secures the supply chain of EVs to the country. Benchmarking can also be done with other neighbours such as Thailand, which adopted EVs earlier and has a higher rate of EV penetration.

Although Lao PDR has strong potential to develop and adopt EVs, there are several challenges that need to be considered. Its low level of infrastructure development is the first barrier. Many of the road networks are still unpaved and underdeveloped, which inhibits access. Coupled with the lack of EV-charging stations, which are currently only available in Vientiane, it will be hard to push people to switch. Infrastructure development coupled with incentives will be necessary to accelerate the transition to low-carbon transport. However, this leads to the second barrier – limited budget and technical resources.

A limited budget will restrain the development of the infrastructure required to attract new EV markets. Technical expertise in EV and low-carbon transport in the country is also lacking, which may hinder EV implementation strategies. A solution is through international cooperation to help reduce the investment financing burden and conduct knowledge transfer and capacity building for local experts. Strategic financing structure within the cooperation scheme will be required to not burden the state budget in the future.

Another barrier is related to policy and regulation gaps. There are currently limited regulations specific to EVs, although the government has a clear target to reach a 30% EV share by 2030 and to build 500 EV-charging stations on urban and rural roads and national highways. The government has also removed import limits and instituted a 30% road tax reduction for EVs. However, the regulations have not addressed several more specific policy issues, such as standardisation, vehicle registration, charging infrastructure, and aligned policies between related ministries (GGGI, 2022; Dixon et. al., 2023). The absence of specific regulations could impact EV uptake from the consumer side as well as the ease of doing business from the supplier side.

Finally, several future threats may also loom from accelerated EV adoption and development. Developing public transit infrastructure in parallel with EV promotion is crucial to relieve the road network burden from the growing number of vehicles, which may worsen the current congestion in cities. Power supply planning is also necessary to incorporate the growing demand of EVs. Although currently the country has a big surplus, the growing demand of EVs may compete with electricity exports, which may affect the sustainability of Électricité du Laos.

### 4.3. Biofuels for Transport

As an agricultural country, Lao PDR has a vast amount of biofuel potential from its agricultural byproducts such as rice, soybean, cassava, maize, sugarcane, as well as oil-producing energy crops like *Jatropha*, coconut, palm oil, and castor oil plants. In 2011, the government targeted a 10% of biofuel share in the transport sector by 2025 (MEM, 2011). It is also aiming to increase the production of biofuels, such as biodiesel and bioethanol, to reduce oil import dependency to fulfil growing energy demand, which mainly comes from the transport sector. In terms of developing biofuel for transport in Lao PDR, a SWOT analysis was conducted (Table 4.4).

**Table 4.4. SWOT Analysis of Biofuel Development for the Transport Sector in Lao PDR**

	Current	Future	
<b>Strengths</b>	<ul style="list-style-type: none"> <li>• High potential of biofuel production from agricultural byproducts</li> <li>• Growing interest from various stakeholders; previous research conducted</li> <li>• Strong international support to develop biofuel production</li> </ul>	<ul style="list-style-type: none"> <li>• May help reduce oil import dependency</li> <li>• A new economic sub-sector could create new revenue and job opportunities, especially in rural areas.</li> <li>• International cooperation from neighbouring countries for biofuel</li> </ul>	<b>Opportunities</b>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>• Lack of coordination amongst stakeholders in biofuel projects</li> <li>• Limited technologies for biofuel production and processing on an industrial scale</li> <li>• Limited budget for research and development</li> <li>• Limited regulations and policy on pricing may hinder biofuel development due to low profitability.</li> </ul>	<ul style="list-style-type: none"> <li>• In a case where a biofuel market is highly developed, competition towards traditional crops may arise.</li> <li>• Biofuel production is target-driven rather than based on overall land available.</li> <li>• Limited development budget on biofuel production</li> <li>• Companies favour exports more than domestic market.</li> </ul>	<b>Threats</b>

Source: Authors.

The interest in the development of biofuels, especially for the transport sector, has been growing for years, but actual development has been slow. Although fuel crop plantations as well as pilot projects have been conducted by private investors – and the government has created policies to promote biofuel production and use – the sector remains hardly developed (Souliyathai et al., 2018). This is related to the economic feasibility and certainty in conducting business.

Kolao Farm and Bio-energy Company, Lao PDR's biggest biodiesel producer, produced 100,000 litres of oil from 400 tonnes of *Jatropha* seeds in 2009, yet it found that profitability was low and the investment returns were uncertain (ADB, 2010). Although policies and targets had been laid out by the government, more specific policies are still required, aligned with expanding coordination and cooperation in research and studies, especially in the implementation stage (i.e. supply chain, production cycle, and industrial-scale processing technology).

## 4. Public Transport in Urban Areas

As a growing economy, Lao PDR has experienced rapid motorisation over the past few years, especially in urban areas. This has led to the problem of congestion in busy areas, which causes economic and environmental loss. Public transit is a solution to help reduce the use of private vehicles. Developing public transport in Lao PDR cities has its own pros and cons (Table 4.5).

**Table 4.5. SWOT Analysis of Public Transport Development in Lao PDR**

	Current	Future	
<b>Strengths</b>	<ul style="list-style-type: none"> <li>High rate of urbanisation resulted in increased demand for transport</li> <li>Strong international support to develop public transit in cities</li> <li>Several previous studies already mapped a development roadmap for public transit systems in bigger cities like Vientiane</li> </ul>	<ul style="list-style-type: none"> <li>Lower congestion in highly populated cities could reduce economic losses and lower emissions levels.</li> <li>Lower emissions and fuel consumption compared to private vehicles</li> <li>Improved economic attractiveness in cities with economic activities</li> <li>Affordable and reliable public transit system will bring significant socio-economic impacts.</li> </ul>	<b>Opportunities</b>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>Low public transit networks and infrastructure currently available</li> <li>Several busy areas have narrow and busy roads; retrofitting or adding public transit is limited.</li> <li>Inconvenient and unreliable existing public transit</li> <li>Services and infrastructure tend to cover fewer low-income people dwelling in suburban areas and other regional peripheries.</li> </ul>	<ul style="list-style-type: none"> <li>High preference towards the use of private cars and motorbikes</li> <li>Lack of integrated strategies with urban development</li> <li>Decreasing trend of public transport usage post-pandemic</li> <li>Lack of a transport governance system may decrease overall public transit reliability.</li> <li>Inequality in accessing public services mainly located in urban areas or growth centres may increase.</li> </ul>	<b>Threats</b>

Source: Authors.

Despite arising challenges in terms of public transport development, plans are already in place, including one to develop a BRT under the Vientiane Sustainable Urban Transport Project, which will be linked to the existing Vientiane Capital State Bus Enterprise (VCSBE) network (ADB, 2021). This will add another 149.0 km to the transport network in Vientiane, which will total 304.4 km.

However, merely adding to the fleet and expanding the network will not provide a long-term solution. Improving transit system governance will be crucial, especially the existing VCSBE, which is known for its unreliability due to an outdated fleet, non-punctual service, and low speed and frequency (UNESCAP, 2022). International support will be integral to provide financial support and technical expertise.



It is also important to implement public transit systems in other growing cities. Luang Prabang and Luang Namtha should also be considered, as these have an increasing number of tourists. Based on Lao Statistics Bureau (2018), in 2017, Luang Prabang attracted 472,942 tourists, and Luang Namtha attracted 600,369 tourists. The number is expected to grow significantly due to the LCR, which passes through these two cities, and to bring more tourists from China. The growing tourism sector may increase the number of businesses, which will ultimately lead to increased urban transport demand.

## 4.5. Intercity Rail

Lao PDR public has a strong positive perception of the LCR, which is seen as attracting foreign direct investment and tourism (Khamphengvong et al., 2022). A SWOT analysis was conducted towards the LCR, which is summarised in Table 4.6.

**Table 4.6. SWOT Analysis of Lao PDR–China Railway**

	Current	Future	
<b>Strengths</b>	<ul style="list-style-type: none"> <li>Well connected with other existing rail networks</li> <li>Interconnected with BRI network</li> <li>Strong perceived benefits and supports towards the LCR and BRI</li> </ul>	<ul style="list-style-type: none"> <li>May increase freight and passenger demand once more integrated with other ASEAN rail network or GMS corridor</li> <li>May attract more FDI</li> <li>Provision of logistic hubs may increase freight demand significantly.</li> <li>Expansion of domestic rail network connected to LCR may increase economic impact.</li> <li>Development of new SEZ along the LCR may attract more investment inflows</li> </ul>	<b>Opportunities</b>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>Higher logistics transport costs compared to other countries</li> <li>Logistic transport operators dominated by local providers, no operator offers integrated multimodal logistic solutions.</li> <li>Only serves 5 provinces in the north</li> <li>Poor road networks conditions along the railway corridor</li> <li>Inefficient trade facilitation and services, especially in border administrations</li> </ul>	<ul style="list-style-type: none"> <li>Without significant policy and efficiency-enhancing reforms, the LCR may not attract the required traffic to reach economies of scale.</li> <li>Inefficiencies in transport governance may inhibit project's sustainable economic impact.</li> <li>Inequality may arise if rail network is not extended to the southern (or other rural) parts of the country.</li> <li>Security checks need to be fortified to reduce transnational crime risks.</li> </ul>	<b>Threats</b>

ASEAN = Association of Southeast Asian Nations, BRI = Belt and Road Initiative, FDI = foreign direct investment, GMS = Greater Mekong Subregion, LCR = Laos–China Railway, SEZ = special economic zone.

Source: Authors.

In 2016, only 2 out of 40.4 million tonnes of freight demand from China to Thailand, Malaysia, and Singapore was transported on land through Lao PDR (World Bank, 2020). This number may increase with the LCR, which may attract new freight demand that had been transported through maritime modes. Efficient services need to be developed, however, to compete with maritime transport modes, both regarding time and cost.

To expand the economic impact of the rail system and to encourage further development in the regions along the LCR, more SEZs could be developed. Integration with other transport systems is also crucial to improve seamless networks within the country. Connecting the rail system with road freight hubs and intercity buses will increase demand and economic impact. Expansion of the rail system is important, especially to the southern part of Lao PDR, to reduce future inequality.

## 4.6. Logistics and Distribution Centres

The World Bank (2018) revealed high freight transport costs in Lao PDR, especially in the less-than-truckload segment, which affects the competitiveness of producers and shippers alike. Several factors characterise this high cost:

- (i) 12 large players (i.e. having a fleet size of more than 50 trucks) and many small firms (i.e. companies with less-than-trucks or owner-operators) mainly working in the informal sectors;
- (ii) low vehicle utilisation as shown by the very low average annual distance driven per truck (i.e. only 55,000 km);
- (iii) large overcapacity (i.e. underutilisation of weight capacity as cargo is more voluminous than heavy in Lao PDR);
- (iv) possibly high vehicle idle times, considering the above two findings;
- (v) overloading (i.e. small companies downsized their fleet used to carry overweight or voluminous loads), which is unlikely to bring a cost benefit to transporters, given the much higher per tonne-km operating costs of smaller vehicles; and
- (vi) low annual mileage, together with the high cost of capital and low profit margins, which prevent companies from investing in more expensive, yet more cost-efficient, vehicles, which in turn increases variable operating costs.

**Table 4.7. SWOT Analysis of Logistics and Distribution Centres**

	Current	Future	
<b>Strengths</b>	<ul style="list-style-type: none"> <li>• Recently opened Lao–China Railway that serves northern Lao PDR</li> <li>• Mekong River used for specific types of cargo with limited volumes with undeveloped ports and navigability</li> <li>• Road cargo transport has some capacity (in term of volumes and weight) but the use is not optimised.</li> </ul>	<ul style="list-style-type: none"> <li>• To shift more goods from road to rail, development of distribution centres that allow transshipments connecting road, rail, and inland waterways should be prioritised, mainly in northern Lao PDR.</li> <li>• To shift more goods from road to inland waterways, development of distribution centres that allow transshipments connecting road, rail, and inland waterways should be prioritised, mainly in northern Lao PDR as well as physical work needs to increase the navigability of the Mekong River.</li> <li>• Development of both modes should increase efficiency of cargo movement inside Lao PDR and shift some cargo movement from/to neighbouring countries</li> </ul>	<b>Opportunities</b>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>• Cargo transported mainly by road</li> <li>• High cargo transport costs compared to those of neighbouring countries</li> <li>• Most transporters are small-scale and in the informal sector.</li> <li>• Low vehicle utilisation and large overcapacity</li> <li>• Low capacity in fleet and logistics management</li> <li>• Minimum role of distribution centres</li> </ul>	<ul style="list-style-type: none"> <li>• Unlikely to bring a cost-benefit to transporters, given the much higher per tonne-kilometre operating costs of smaller vehicles</li> <li>• Increasing variable operating costs as annual mileage and profit margins low</li> <li>• Difficult to renew fleet to invest in more cost-efficient vehicles</li> <li>• May increase cargo transport cost more than decrease the sector's competitiveness</li> </ul>	<b>Threats</b>

Source: Authors.

The above situation of cargo or freight transport in Lao PDR clearly shows inefficient energy use as well as high externalities (i.e. high emissions and air pollution). Cargo transport in the country is also facing the inability to operate in a more efficient manner where weight- and volume-adequate vehicles can be dispatched to move goods in their optimal capacity ratios while minimising the number of idle vehicles as well as deadheading vehicles where productivity and profit can be maximised, and externalities minimised.

## 5. Key Policy Directions for Transport System and Market

Transitioning to a sustainable transport system in Lao PDR has the potential to bring down the country's emissions and to improve energy security and economic impact. Lao PDR aims to achieve a 30% EV share by 2030, with supporting factors such as abundant hydropower, technological adaptability, and international collaboration, including proximity to China's EV industry. However, challenges include low infrastructure development, limited financing schemes and technical resources, and policy and regulation gaps. Although developing EVs is crucial, transitioning towards sustainable transport may need to go beyond EVs only. Alternatives include biofuel development, public transport improvement, intercity rail enhancement, and logistics and distribution centre advancements. Based on the SWOT analyses, to achieve a sustainable transport system in Lao PDR, the following implementation programmes and policies are recommended.

### 5.1. Short-Term Plan (2–5 years)

- (i) EV acceleration
  - (a) **Develop regulatory frameworks for EVs.** Policies such as incentives, standardisation, charging tariffs, charging infrastructure, and vehicle registration should be addressed to increase attractiveness, both on the demand and supply side.
  - (b) **Expand public transport.** Incentives towards private companies willing to invest in public transport should be provided.
  - (c) **Prioritise electric motorcycles for private EVs.** Motorcycles constitute a more affordable private vehicle mode.
- (ii) Biofuel development
  - (a) **Incentivise private actors willing to implement biofuel production on an industrial level.** Fiscal incentives may be provided to increase attractiveness and profitability. Other non-fiscal support may be provided, such as training and capacity building.
- (iii) Public transport improvement
  - (a) **Renew fleet of buses.** Inefficient high-emitting bus fleets should be replaced with newer fleets to improve the reliability of the entire bus transport system.
  - (b) **Improve transit system governance.** The current bus transit system needs to increase efficiency, punctuality, reliability, and convenience.
- (iv) Intercity passenger and freight rail
  - (a) **Develop new SEZs along the railway.** This will accelerate the economic impact and as well attract new opportunities to the country.
- (v) Domestic fuel price adjustment
  - (a) **Adjust domestic gasoline/diesel prices to reflect international oil prices.** Strategically reducing subsidies will reduce the dependency on oil consumption and help make the transition to EVs more appealing. However, it will need to be done carefully to not have a bigger impact on the economy.

- (vi) Integration and intramodality of transport systems
  - (a) **Promote the integration of different modes of transport.** This will establish a smooth and uninterrupted travel experience for tourists. The availability of multimodal hubs will facilitate seamless transfers between trains, buses, and other transport modes.
- (vii) Sustainable tourism development
  - (a) **Implement regulations and incentives to encourage sustainable practices in the tourism industry.** Eco-friendly transport options, such as bicycles, e-scooters, and walking paths within tourist destinations, should be encouraged.
- (viii) Community engagement
  - (a) **Engage with local communities in transport planning and decision-making processes.** Community needs must be effectively addressed, and their priorities and preferences incorporated.

## 5.2. Medium-Term Plan (5–10 years)

- (i) EV industry development
  - (a) **Prepare an EV industry ecosystem area in an SEZ.** Providing a special area specific for EV industry will attract investments. An SEZ near the LCR will be suitable due to the connectivity with China, which will secure the supply chain of components.
  - (b) **Set a transfer of technology policy for foreign investors.** The policy will stimulate the development of the domestic EV industry and accelerate research and development with a relatively smaller state budget.
- (ii) Biofuel development
  - (a) **Ensure integration with international supply chain of biofuel market.** The international market for biofuel products must be ensured to increase the profitability of local businesses. However, certain policies will be required to ensure that domestic demand is securely provided.
- (iii) Intercity passenger and freight
  - (a) **Develop new logistic hubs near the LCR and SEZs.** New logistic hubs will improve freight transport coverage as well as increase economic activity in regions close to the LCR, especially in SEZs.
  - (b) **Modernise the cargo transport sector.** This must include the growing level of functional integration of supply chains and distribution centres.
- (iv) Public transport expansion
  - (a) **Expand urban public transport systems in emerging cities.**
- (v) Logistics and distribution centre development
  - (a) **Open the country to integrate to global supply chain.** Lao PDR should start unlocking its market and distribution potential through more geographical integration, not only at the national level but the broader regional level. Currently, the country is not the main destination or origin of the commodities trade, but it needs to explore its potential. Intermediate locations in the regional distribution will be fundamental to the geography of freight circulation, as they provide connectivity between corridors in the region. With this involvement in the global supply chain, the internal logistics and distribution centres of Lao PDR should be developed, which will start to bring in local production centres.

- (b) **Improve integration between transport and inventory control by promoting the emergence of major coordinators and integrators in the logistic industry.** Freight distribution in Lao PDR should start to shift from inventory- to replenishment-based logistics where manufacturers play dominant roles to match the commodity demand by taking advantage of more integrated and efficient suppliers, manufacturers, and distributors.

### 5.3. Long-Term Plan (10–20 years)

- (i) Expansion of the railway line across the country
  - (a) **Enhance connectivity between different regions of Lao PDR.** To boost cross-border commerce, promote regional integration, and strengthen Lao PDR's position as transit hub, this expansion should be focussed on connecting the southern part of Lao PDR.
- (ii) EV development
  - (a) **Expand public transport services.** E-buses, e-minibuses, and e-vans should connect people.
  - (b) **Provide fiscal and non-fiscal facilities for private actors.** They will continue to help develop public transport, including EV-charging infrastructure and systems.
- (iii) Development of logistics and distribution centres
  - (a) **Achieve a more functionally integrated supply chain.** This situation should be marked by the emergence of large logistics operators that control many segments of the supply chain and developed economies of scale in distribution supported by advanced information technology and intermodal transport integration.
  - (b) **Develop distribution centres to link production and consumption.** In this phase, distribution centres should provide an interface between the industrial and retail geographies of the supply chain concerned. Distribution centres can perform numerous value-added activities, ranging from warehousing, packaging, and labelling to final assembly and taking returns.

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